

AUTOMOTIVE INDUSTRIES

AUTOMOBILE

Volume 67

Reg. U. S. Pat. Off.

Number 4

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Automotive Industries is published every Saturday by
CHILTON CLASS JOURNAL COMPANY
 Chestnut and 56th Streets, Philadelphia, Pa.

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Controlled by United Business Publishers, Inc., 239 W. 39th St., New York;
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 dent; C. A. MUSSELMAN, Vice-President; F. C. STEVENS, Treasurer.

SUBSCRIPTION RATES: United States, United States Possessions, and all
 countries in the Postal Union, \$1.00 per year; Canada and Foreign, \$4.00 per year.
 Single Copies 25c.

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 Member Associated Business Papers, Inc.

Automotive Industries—The Automobile is a consolidation of the Automobile
 (monthly) and the Motor Review (weekly), May, 1902; Dealer and Repairman
 (monthly), October, 1903; the Automobile Magazine (monthly), July, 1907, and the
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July 23, 1932

Automotive Industries

Hudson Zooms Into Low-Price Field With Essex Terraplane

by Athel F. Denham

A NEW and smaller Essex, known as the Terraplane or Model K, with an engine of the same size as used in the standard Essex line, has been placed in production by the Hudson Motor Car Company. All eleven models are mounted on a 106 in. wheelbase.

With prices as low as \$425 (f.o.b.) for the roadster model, the list of this new car is \$20 under the Chevrolet, and \$35 under the new Ford 8 roadsters, thus injecting itself definitely into the lowest-priced field.

With a standard coach body, ready for the road, the new model weighs only 2300 lb. or slightly more than 30 lb. per horsepower, which low specific weight gives it exceptional performance. It is said that acceleration from 15 to 50 m.p.h. can be accomplished in eight seconds.

Although the engine design is substantially the same as that of the standard Essex model, several changes have been made with a view to assuring smoother operation and increased power. A composite aluminum-cast-iron cylinder head is used, with a new form of compression chamber, and the compression ratio is 5.8 to 1. The cylinders are block-cast and have a bore of 2 15/16

\$425 for Roadster, prices range to \$590 for range of 11 models powered with six-cylinder, 193 cu. in. engine, developing 70 hp. at 3200 r.p.m.

Essex Terraplane convertible coupe, priced at \$610 f.o.b.

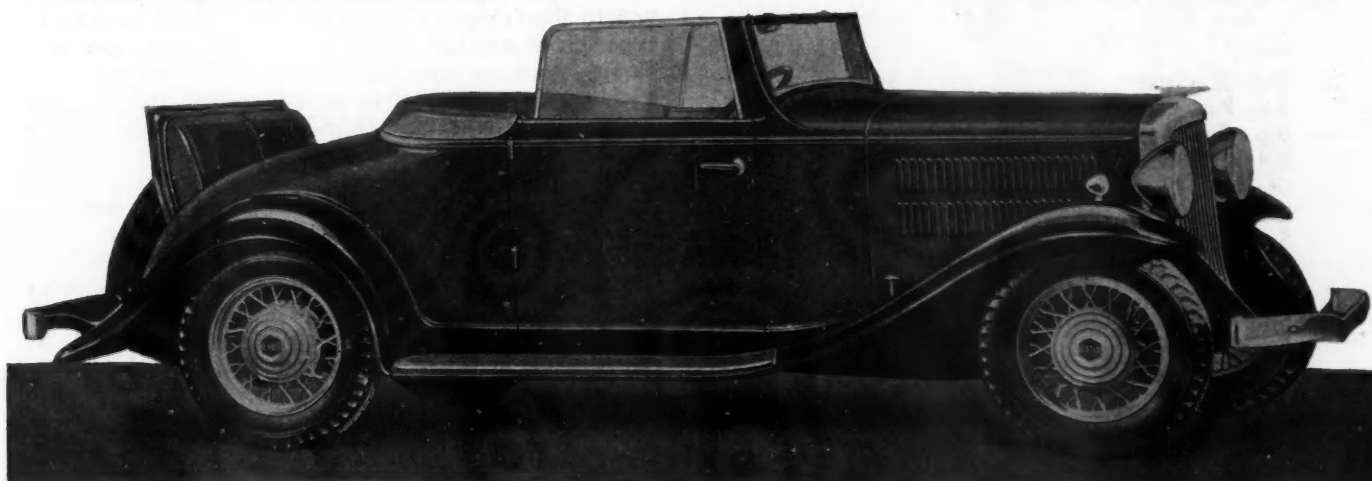
in. and a stroke of 4 3/4 in. Piston displacement is 193 cu. in.

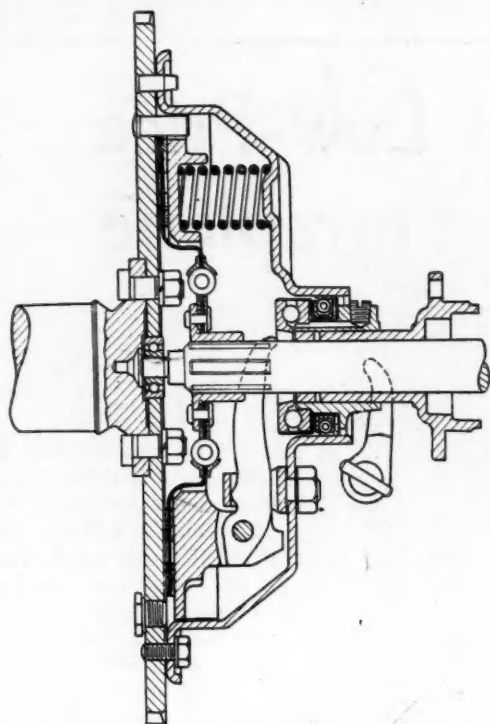
A downdraft carburetor, a large-size inlet manifold, camshaft drive through fabric gears, and an alloy cast-iron camshaft are powerplant features.

Cooling-water circulation is by a pump, instead of by thermosiphon action, and the powerplant has a new three-point mounting which reduces transmission of engine noises and vibration to the body. An A.C. intake silencer and an A.C. fuel pump are regular equipment.

The exhaust muffler is supported on the frame by rubber grommets.

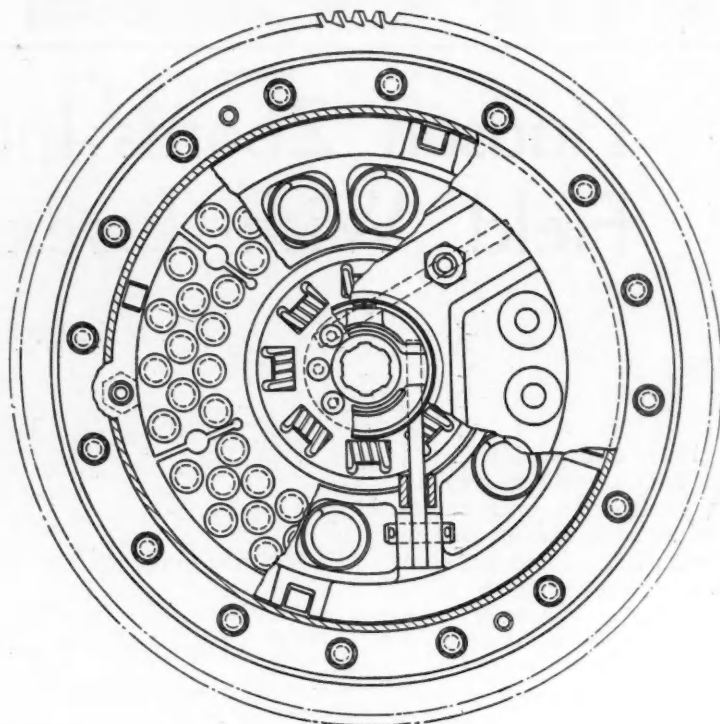
The cast-iron bell housing is skeletonized for the sake of weight reduction, and the clutch cover is made of a light stamping. The transmission is of a new design featuring compactness and light weight. Without a decrease in the face width of the gears, the length of the transmission has been reduced, and an incidental advantage is that the movement of the shift lever in changing from one gear to another has been shortened. The rear axle also is a new design in which it has been possible to reduce the diameter of the driving shafts by decreasing the overhang of the shafts over the





outer axle bearings. Usually the overhang is determined by the fact that the brake drum must be located between the wheel hub and the end of the axle housing. In the new Essex a new type of wire wheel, designed by the Hudson engineering dept., is used, which has a hub of such large diameter that the brake drum can be placed inside of it (see illustration). With this design it has been possible to reduce the distance between spring pad and wheel center to 6 in. and to limit the track to 54 in.

Another design feature that helps to increase the rigidity of the axle housing without increasing its



The clutch thrust bearing and pilot are now of ball type in the Essex Terraplane

Essex Terraplane Prices

Note that these prices average midway between the Ford 4 and Ford 8, except for the Sport Sedan which is lower than the Ford 4.

2-p. Roadster	\$425
2-p. Bus. Coupe	470
5-p. Coach	475
2-4 p. Coupe	510
Standard Sedan	550
Convertible Coupe	610
Sport Roadster	525
Sport Bus. Coupe	510
Sport Coach	515
Sport 2-4 p. Coupe	550
Sport Sedan	590

weight is that the cover for the center housing is welded in place. The usual differential carrier is provided, and adjustment of the gears is effected by means of shims under the pinion head.

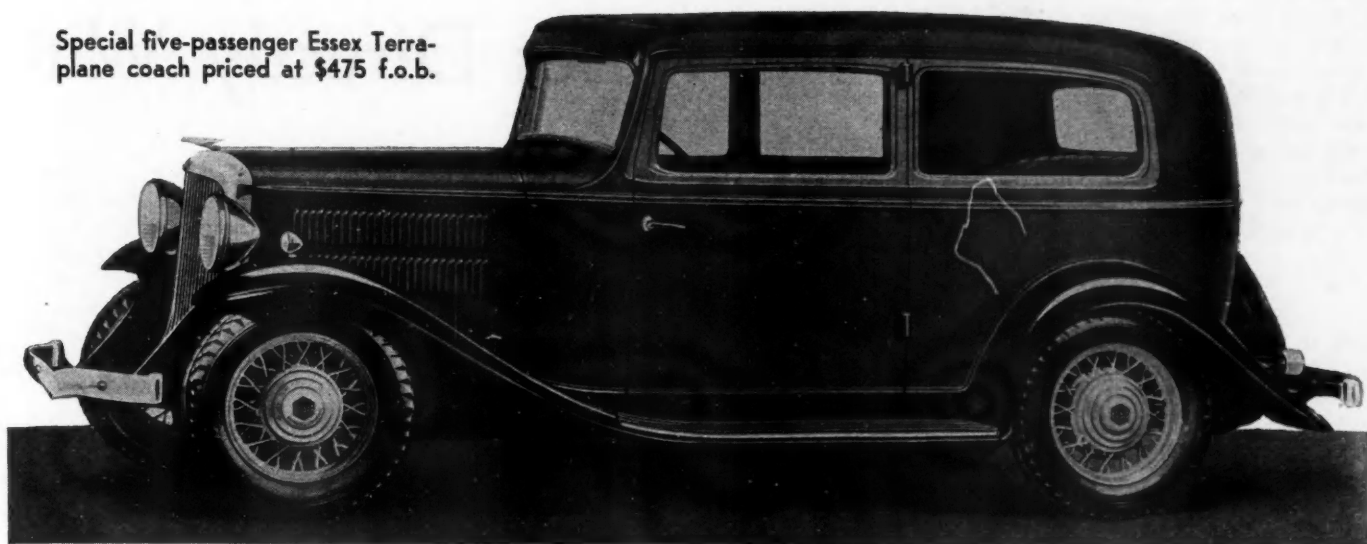
One of the principal means toward weight saving consists in so tying the frame structure and body together that they form a comparatively rigid unit. The bottom pan of the body, which extends over nearly its entire length, not only serves as an important structural part of the body but also as a frame cross-member.

There are some 20 points of attachment of the body pan to the frame, including several on the central X-type cross-member, with the result, the company claims, that an unusually light frame gives ample rigidity. The front seat also is bolted through the body pan to the X-type cross-member, and the instrument "board" forms a cowl brace.

In the design of this new model by Stuart G. Baits and his staff of Hudson engineers, only such items of recent development were considered as appeared to them essential in a car of this class, including a fully adjustable steering column, sliding seats, body insulation, and intake silencer, engine mounting on live rubber, transmission with helically-toothed gears in constant mesh, a glove compartment in the dash, and the necessary dash instruments. Warning lights show when the generator or oil pump fails to function.

The Bendix brakes fitted are rather unusual in that their diameter is only 9 in. and the shoes are short,

Special five-passenger Essex Terra-plane coach priced at \$475 f.o.b.



but the resulting loss in braking surface is made up by an increase in the width of the linings. These brakes are cable-operated and are hooked up diagonally, the left front and right rear working together.

As regards the bodies, there is a distinct family resemblance to the larger Essex line, and credit is due to the designers for having maintained proper proportions while shortening the car. The latter is approximately 3 in. lower than the standard Essex, but the headroom is claimed to be ample and the road clearance has been even slightly increased, this having been made possible by a reduction in the height of the frame section. Good engineering, tending toward economy in production, is reflected by various items of the sheet metal work. For instance, by carrying the one-piece front splash pan up into the front fender skirt, the stamping operations are facilitated and the amount of material required for a fender stamping is reduced.

Some of the units warrant further description. The cylinder head has more than the usual water capacity, which is one of the factors making possible the high compression ratio used. Spark plugs are located over the exhaust valves, which further tends to suppress detonation. Beyond the valves there is a rather high dome, and this is followed by a low-clearance space over part of the piston.

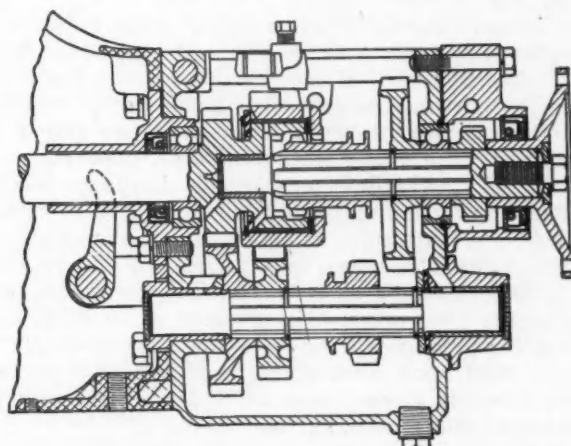
A water pump is used for the first time on an Essex model. It is combined with the fan and is belt-driven. Of the three points of support for the powerplant, one is located at the rear of the transmission, while two are at the front. These latter are of fairly soft rubber and cupped to permit of a limited amount of deflection under fluctuations in the torque reaction.

There is a breathing passage from the clutch housing to the transmission case, and ball bearings are used for both the clutch throw-out and the pilot. The latter, while packed in grease at the factory, has provision made for its lubrication by splash and drain from the clutch cover. Grease can be added at any time by removing a plug provided for that purpose. The clutch plate carries the now conventional cushioning springs between the disk and its hub. Attention may be called

also to the steel flywheel to which the clutch plate is doweled.

A feature of the transmission, which accounts for its shortness and light weight, is the use of internal-external-gear clutches for engaging the direct drive and intermediate speed. The shifting unit on the main shaft which engages these gears has only one set of teeth. From the accompanying sectional view of the transmission it may be seen that the second-speed main-shaft gear is not carried on the main shaft but on the drum-shaped extension of the countershaft drive gear. Between the second-speed gear and the drum there is a babbitt-lined, thin-shell, tubular bearing.

(Turn to page 126, please)



Internal-external-gear clutches are used for engaging direct and intermediate speeds

Ground-Contact Area Varies Directly With

Load carried increases with the deflection and inflation pressure, and is further added to by the stiffness of the tire wall structure

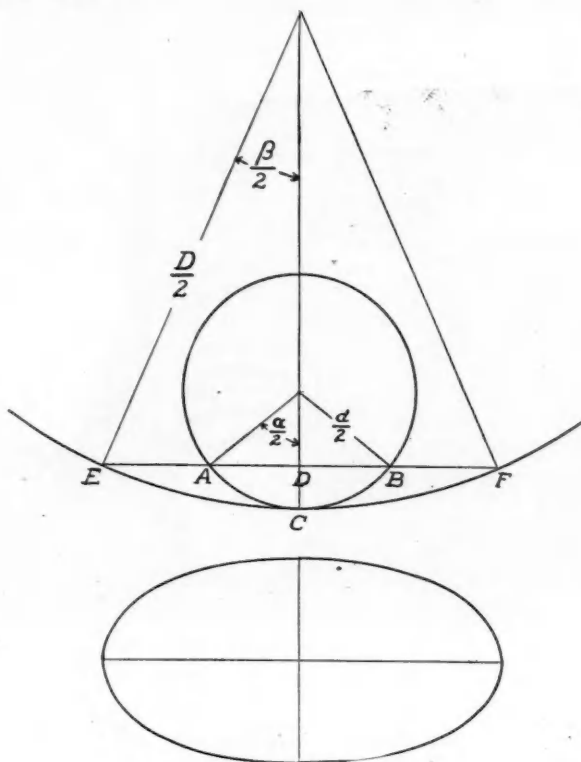


Fig. 1—Diagram of ground-contact area with annular air bag of circular section

by P. M. Heldt

ONE of the problems with which the engineers of all car-manufacturing firms are now confronted is that of low-pressure tires. These tires represent a step in the same direction as that which was taken about 1923 when the present balloon tire was introduced, which later completely superseded the high-pressure tire.

At that time the original plan of using inflation pressures of 20-24 lb. p. sq. in. had to be abandoned, because of adverse effects of the low pressure on the steering and riding qualities of the car under certain conditions, and materially higher inflation pressures (35-40 lb. p. sq. in.) were finally settled upon as standard.

In the meantime considerable headway has been made in overcoming the difficulties of hard steering and front-end instability, so that a further lowering of inflation pressure seems now warranted. But just how far is it advisable to go? The early advocates of low-pressure tires proposed a pressure of 10 lb. p. sq. in., but those manufacturers who now offer to supply their cars with such tires at the option of customers are considerably more conservative and recommend pressures of 20-24 lb. p. sq. in.

In judging the riding qualities obtainable with different sized tires and different inflation pressures for a given wheel load, it is desirable to know the relation existing between tire deflection, ground-contact area and wheel load. This subject is a rather difficult one to deal with mathematically, owing to the irregular shapes of the tire covers, but an approach to it can be made by assuming the tire to consist of an air bag

of perfectly circular form, the wall of which, while inextensible, offers practically no resistance to deformation.

In an actual tire, of course, while the greater part of the load is supported on the air cushion, a certain small proportion is supported by the walls of the tire cover acting as an elastic solid, and some allowance must be made for this. It is also a reasonably safe assumption that the loads required to produce various proportional deflections of the tire cover (considered distinct from the air cushion) are directly proportional to the deflections.

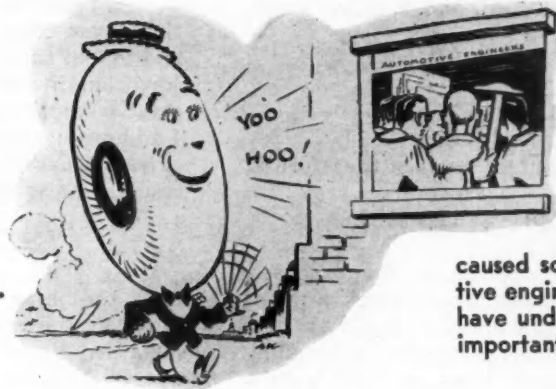
It will be shown later that the ground-contact area of an ideal tire with a thin, infinitely flexible wall varies substantially as the deflection, expressed as a percentage of the nominal section diameter; and if, as assumed, the tire cover itself has the properties of a perfectly elastic solid, then the load supported by the tire should be in direct proportion to the percentage deflection.

In determining the ground-contact area of a tire of given dimensions under a given proportional deflection, we assume the tire to be of absolute circular section, equal to the nominal diameter. Under the load on the tire the section flattens at the line of ground contact AB. (Fig. 1) the deflection of the tire is represented by the line CD, which is equal to the product of the versin of the angle $\alpha/2$ (half the angle subtended at the center of the section by the ground-contact line AB) into the tire-section radius.

When the tire section flattens under the influence of

of Tires Deflection

the load, it is either necessary for the portion *ACB* of the circumference of the section to compress to the length *ADB*, or else for the remainder of the section to deform from the circular shape, the points *A* and *B* moving apart until the distance between them is equal to the length of the arc *ACB*. The latter is substantially what actually takes place, and in determining the width of the area of contact we take the length of the arc *ACB* which corresponds to the versin *CD*. It would take great force to compress the tread of the tire to reduce its width from *ACB* to *ADB*, whereas the side walls of the tire cover can be moved apart with little force while the tread is being flattened out.



This mathematical consideration of tire pressures, contact areas, etc., is the third of our series on the new low-pressure balloons. Perhaps nothing in recent years has caused so great a stir among automotive engineers as this subject, which we have undertaken to discuss from every important point of view.—Editor.

The form of the ground-contact area made by the tire is that of an ellipse. It will be seen from Fig. 1 that if we denote the radius of the tire section by $d/2$ and the radius of the tire by $D/2$ then

$$d/2 \text{ versin } \alpha/2 = CD = D/2 \text{ versin } \beta/2$$

hence

$$\text{versin } \beta/2 = (d/D) \text{ versin } \alpha/2$$

In calculating the length of the area of contact or the major diameter of the ellipse, it is preferable to take the cord rather than the length of the arc. Owing to the smallness of the angle subtended at the axis of the wheel by the major diameter of the ground-contact ellipse, there is not much difference between the lengths of the cord and the arc, and it is, of course, much more difficult for the tire to deviate materially from the circular form in the plane of the wheel than in the plane of a tire cross section.

It is usual to express tire deflections in percentages of the nominal diameter of the tire cross section, for the reason that a certain percentage deflection represents a fairly definite stress on the tire.

Calculating Contact Area

The method of calculating the area of contact of a tire of given dimensions when deflected a certain percentage of its nominal diameter may be illustrated by an example. We will take the proposed 6.00/16-in. tire, that is, a tire of 6.00 in. nominal diameter of cross section on a rim of 16-in. base diameter. The outside diameter of this tire is 28.42 in. If we assume a deflection of 18 per cent, the actual deflection is $6 \times 0.18 = 1.08$ in. Therefore

$$CD = 1.08 \text{ in.}$$

and

$$\text{versin } \alpha/2 = 1.08 / 3 = 0.36 \text{ in.}$$

From a table of trigonometric functions we find that $\alpha/2$ is 50 deg. 15 min. The length of the arc *ACB* therefore is

$$6 \times 3.1416 \times (50.25/360) \times 2 = 5.26 \text{ in.}$$

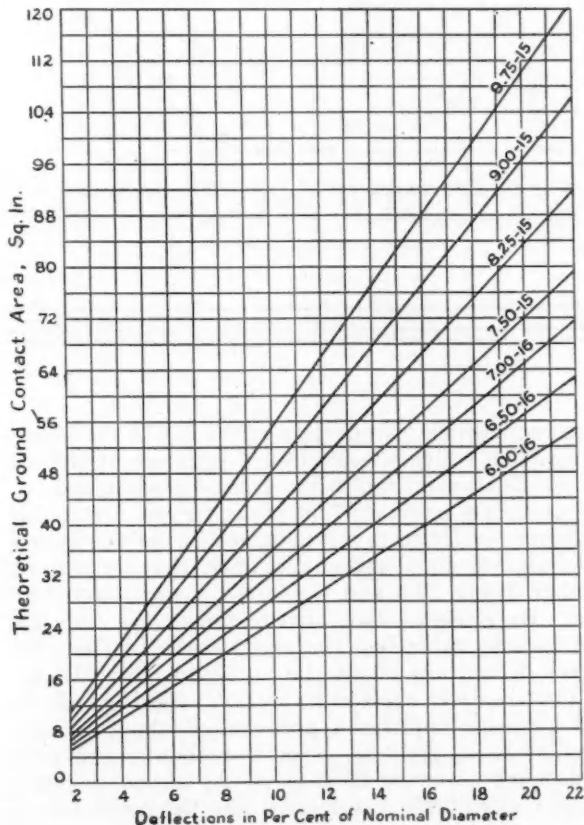
This is the width of the contact surface of the tire on the ground.

To obtain the length of the contact surface we start from the consideration that the versin of the angle subtended at the axis of the wheel by one-half of the long diameter of the contact ellipse is equal to 1.08 divided by one-half the outside diameter of the wheel, viz., 14.21 in.

$$\text{versin } \beta/2 = 1.08/14.21 = 0.076$$

Fig. 2—Theoretical ground-contact areas for different tire sizes and different proportional deflections

(As shown in the text, the actual contact areas of low-pressure tires are about 77 per cent of those given by this chart)



This is the versin of $22^\circ 30'$, the sine of which is 0.383.

Consequently the length of line EF is

$$28.42 \times 0.383 = 10.87 \text{ in.}$$

The area of the ground-contact surface therefore is

$$5.26 \times 10.87 \times 0.7854 = 44.9 \text{ sq. in.}$$

Theoretical contact areas for all of the proposed standard low-pressure tire sizes for different proportional deflections have been calculated in this way, and the results are plotted in Fig. 2. Curiously enough, all of the points fall on straight lines (at least within the errors of computation and plotting), so that the ground-contact area varies in direct proportion to the deflection.

In actual low-pressure tires the ground-contact area for any given proportional deflection is considerably smaller than that found from Fig. 2. This is due principally to the fact that when the tire section deflects under load, not only is the bottom part of the section flattened out, but the side walls bulge or arch more, thereby adding to the deflection.

Thus for a given contact area the deflection is greater than calculated under the assumption that only the bottom part of the section is deformed under load, and, inversely, for a given deflection the ground-contact area is smaller. This deformation of the side walls under load is illustrated in Fig. 3, which shows sections of the U. S. Super-Balloon 7.00-16 tire without load and under a load of 900 lb., which latter produces a deflection of a trifle over 18 per cent.

It is thus seen that the actual effective ground-contact area is smaller than calculated under the theoretical conditions assumed in the early part of this article. But how much smaller is it? Some light is thrown on this problem by the load-deflection chart Fig. 4, for which the writer is indebted to B. J. Lemon of the United States Rubber Company. This chart applies to a U. S. Super-Balloon tire of 7.00-16 in. size. The data from which the chart was plotted were obtained under the condition of uniform inflation pressure, which means that as the load on the tire was increased, some of the air was allowed to escape to keep the inflation constant.

From the fact that all load-deflection lines are substantially straight, it follows that the load varies uniformly with the deflection. However, the load is not absolutely proportional to the deflection, as in that case all lines would pass through the zero point of both scales. There appears to be a very slight curvature in the lines, and it may be that this would increase if the lines were continued to cover lower proportional deflections. It seems entirely reasonable to assume that all lines should pass through the zero point, which would simply mean that zero load corresponds to zero deflection.

If both the resistance of the tire cover to deflection and the ground-contact area varied in direct proportion to the percentage deflection, then the load supported should be expressible by an equation of the form

$$L = ad + bpd,$$

where a and b are constants depending on the size of the tire; d is the deflection in per cent, and p , the inflation pressure, in lb. p. sq. in. It was found, however, that the data of Fig. 4 would not fit well an equation of this form. It was then thought that perhaps the in-

flation pressure had an effect on the stiffness of the tire cover considered separate from the air cushion, and to test this out another term was introduced in the equation, involving the inflation pressure and a constant. Applying this to the data represented by Fig. 4 and evaluating the constants by means of the method of least squares, it was found that these data can be represented most accurately by the following equation:

$$L = 8.69 d + 2.61 pd - 4.2 p.$$

Of the three terms of the right-hand side of the equation, the middle one evidently represents the load sustained directly on air. This would point to an effective ground-contact area equal to $2.61 d$ sq. in. For a proportional deflection of 20 per cent this gives for the 7.00-16 tire a ground-contact area of 52.2 sq. in., as compared with the 68 sq. in. according to Fig. 2. It would thus seem that in an actual tire about 77 per cent of the theoretical ground-contact area can be figured on as the effective contact area.

This effective ground-contact area is not the actual ground-contact area of which a pattern can be obtained by suitable means. The latter depends to a very considerable extent upon the formation of the tread. What

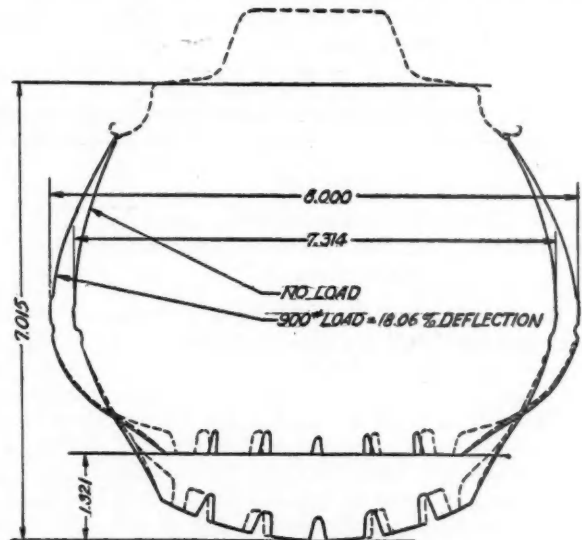


Fig. 3—Cross-sections of 7.00/16 low-pressure (U. S. Super-Balloon) tire without load and under load of 900 lb.

it does represent is that portion of the inside surface of the tire from which the downward pressure of the air on it can be transmitted to the ground mechanically.

For instance, a certain 7.00/16-in. tire with non-skid tread when subjected to a load of 900 lb. deflects nearly 19 per cent of its nominal diameter, the net contact area then being 29.5 and the gross contact area 39.9 sq. in. By gross contact area is meant the area inclosed by the outer boundaries of the actual contact surfaces, which are all on the anti-skid ribs. To deform the tire cover itself so its section height is reduced by 19 per cent requires a pressure of about 145 lb., hence 755 lb. of the load is carried on air, and with an inflation pressure of 18 lb. p. sq. in., this corresponds to 42 sq. in. of contact surface. The net contact area

Table I—Experimental Practice, Low-Pressure Balloon Tires for Passenger Cars,
Load and Inflation Table, Tire and Rim Association

Min. Infla. Press.	6.00		6.50		7.00		7.50		8.25		9.00		9.75	
	15	16	15	16	15	16	15	16	15	16	15	16	15	16
16	560	585	665	695	770	805	875	915	985	1025	1070	1090	1135	1185
17	595	620	705	735	815	850	925	965	1040	1080	1130	1150	1195	1245
18	630	660	745	780	860	900	975	1020	1095	1140	1190	1210	1260	1310
19	665	695	785	820	905	945	1025	1070	1150	1195	1250	1270	1320	1375
20	700	735	825	865	950	995	1075	1125	*1205	*1255	*1310	1330	1385	1440
21	735	770	865	905	995	1040	1125	1175	1260	1310	1370	1390	1445	1505
22	*775	*810	*905	*950	*1040	*1090	*1175	*1230	1315	1370	1430	1450	1510	1570
23	...	...	...	...	...	...	...	...	1370	1425	1490	1510	1570	1635
24	...	...	...	...	...	...	...	...	†1425	†1485	†1550	†1570	†1635	†1700

NOTE: * Maximum Loads for 4-Ply Tires
† Maximum Loads for 6-Ply Tires
This table not to be used for buses or trucks

Adopted May 13, 1932.

is therefore only 70 per cent and the gross contact area, which latter is 95 per cent of the theoretical. The tire tread forms a sort of bridge which is uniformly loaded at 18 lb. p. sq. in. over its "roadway," while the pressure of the bridge pillars (the anti-skid ribs or knobs) on their supporting areas is greater than the inflation pressure of 18 lb. p. sq. in.

A load-and-inflation-pressure table for low-pressure tires in experimental service has been adopted by the Tire & Rim Association and is reproduced herewith. This table, the writer understands, is based on a proportional deflection of 17½ per cent. If we assume an inflation pressure of 20 lb. p. sq. in., the load capacity of the 7.00-16 in. tire, according to the equation developed in the foregoing, figures out to

$$8.69 \times 17.2 + 2.61 \times 20 \times 17.5 - 4.2 \times 20 = 152 + 914 - 84 = 982 \text{ lb.,}$$

as compared with the 995 lb. at which the tire is actually rated, or to not quite 2 per cent less than the rating.

The figures given in Table I permit of calculating the amounts allowed in the load ratings for the stiffnesses of the tire covers. Since the deflection assumed is the same throughout, the effective ground-contact area evidently is constant and independent of the inflation pressure. The amount of load sustained by air pressure is then directly proportional to the inflation pressure, while that sustained by the elastic structure of the tire

cover is constant. We therefore have

$$L = ap + c.$$

Taking the figures for the 9.75-16 tire (the last column of the table), we get

$$1245 = 16a + c \text{ and}$$

$$1785 = 24a + c$$

from which it follows that

$$16a = 1080 \text{ and } c = 165 \text{ lb.}$$

Thus an allowance of 165 lb. is made for the stiffness of the cover. This allowance decreases with the size of the tire, as shown by the table below:

9.75-16	165 lb.	9.75-15	145 lb.
9.00-17	155 lb.	9.00-16	135 lb.
9.00-15	130 lb.	8.25-17	110 lb.
8.25-16	105 lb.	8.25-15	105 lb.
7.50-16	75 lb.	7.50-15	75 lb.
7.00-16	45 lb.	7.00-15	50 lb.
6.50-16	15 lb.	6.50-15	25 lb.
6.00-16	-15 lb.	6.00-15	-13 lb.

The figures in pounds given in the above table represent the pressures or loads required to deform the respective tire covers so as to reduce their vertical height by 17½ per cent of the nominal diameter.

The rapid decrease in the allowance for cover stiffness with the size of the tire, and especially the negative allowances for the two smallest sizes, is rather puzzling.

The stiffness of the tire for which test results are given in Fig. 4 can be determined from the data plotted in that chart. For a 25 per cent deflection, for instance, we have a load of 1125 lb. with an inflation pressure of 15, and a load of 1730 lb. for an inflation pressure of 25 lb. p. sq. in. Calling the load required to deflect the tire cover 20 per cent x , we have

$$1125 = 15A + x, \text{ and} \\ 1730 = 25A + x,$$

(Turn to page 128, please)

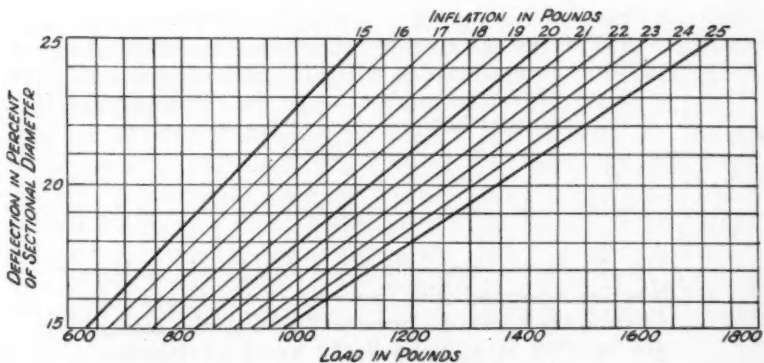


Fig. 4—Load-deflection diagram for 7.00/16 low-pressure tire

Micromatic Heavy-Duty Hone Is Used on Automatic Set-Up

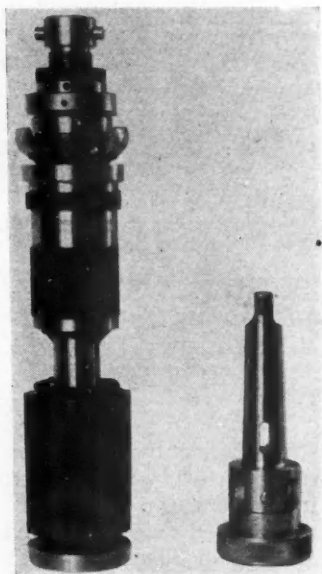
AMONG the interesting developments in this year's production lines is an application of the Micromatic hone made by the Micromatic Hone Corp., Detroit, Mich., for finishing the bores of a popular V-8 engine. The model 1-A-O-F hone (Fig. 1) is a heavy-duty, high production, automatic tool built for a range in diameters from 2 15/16 to 4 1/8 in. Except for improvements in design, the principle of operation is about the same as the tool which was described in *Automotive Industries*, Nov. 16, 1929, p. 717.

Honing follows finish-reaming, the floor to floor time being two minutes. Bores are held to a tolerance of 0.0005 in. for roundness and straightness. The amount of metal removed is 0.003 in. It is claimed that a set of stones gives 600 finished bores.

The operation is performed on a No. 214 multiple spindle hydraulically reciprocated Barnes honing machine shown in Fig. 2, which is provided with a hydraulically operated trunnion-type indexing fixture. Four cylinders are honed at a time, the fixtures being arranged for a lateral movement to center both banks of cylinders so as to compensate for the offset between them. A four-spindle multiple head is mounted with provision for two additional spindles if needed.

On this job the final diameter is controlled in the

Fig. 1—Heavy-duty Micromatic hone with "Quiklock" universal driver at the right



reaming operation while the honing machine is equipped with an electrically operated counting device for controlling the number of cycles of reciprocation. By this method a uniform amount of stock is removed from each bore in honing.

A basic feature of the set-up is the sizing block located directly above the trunnion fixture in Fig. 2. The three expansion fingers of the hone automatically expand the abrasive members as they enter the sizing and guiding bushing and likewise contract them as the fingers emerge from the bushing on the final upward stroke. The fingers slide up and down in the bushing as the tool is reciprocated during the entire honing period. Ball thrust bearings prevent the fingers from spinning in the bushing and thereby eliminate excessive finger wear.

The single cone principle of expansion is said to facilitate the quick removal of metal and maintain accuracy. With this arrangement each stone holder has only one point of contact at the cone, thereby permitting each stone to rock independently of the others. The tilting and rocking action combined with the effect of the universal joint provided in the "Quiklock" driver, allows sufficient floating action to compensate for slight misalignment of the machine spindle with the operating bushing and cylinder bore.

Apart from the economy afforded by the full automatic operation of the hones, it is claimed that the particular features of design permit from 35 to 40 per cent more stone wear than is customary. Moreover, since the stones are mounted in inexpensive steel stampings which are discarded when the stones wear out, there is an additional saving due to the elimination of storing expensive holders, remounting, and so on.

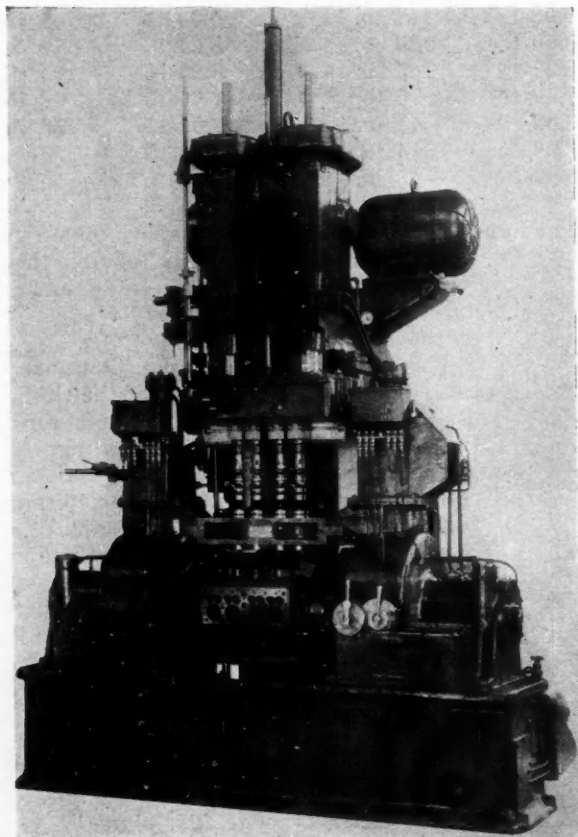


Fig. 2—Barnes hydraulically reciprocated honing machine equipped with four Micromatic hones for finishing the bores of a popular V-8. Cylinder blocks are handled in a hydraulically operated trunnion fixture. The sizing block controlling the action of the hone is shown directly above the fixture

JUST AMONG OURSELVES

Better Transportation—Fewer Counties

ALFRED REEVES showed a new way in which transportation has made possible cuts in government expense when he talked the other day down at University of Virginia's Institute of Public Affairs.

"In the early days of the Republic," he said, "the township and then the county were the chief political units, based on the ability to move around. And so now we have inherited from an earlier time administration agencies which frequently are obsolete today and which could be abolished at great savings in cost.

"The 3000 county governments in the United States could be consolidated in 800 with added efficiency and reduced cost, just as we have consolidated the little red schoolhouses into well constructed buildings and well-staffed organizations."

Move Fast and Get More Holidays

WHO can tell what great benefits may still come in the future from even faster and more efficient transportation. Take the matter of holidays. In the month of August, for example, a holiday is being celebrated somewhere in the world on 20 of its 31 days—and there are four Sundays in addition.

If one could only get about quickly enough he could be in on a celebration or a rest on all except seven days. He could get in on the San Salvador Fair,

the Abolition of Slavery holiday in Jamaica, Coconut Day in Bombay, the Queen's Birthday in Dutch Guiana, King Faisal's Accession in Iraq, Independence Day in Uruguay and what have you.

Here's to bigger and better holidays.

Big Bank Thinks Worst May Be Over

IT'S encouraging to find so large and so conservative a banking institution as the Guaranty Trust Co. of N. Y. saying that:

"Some dissipation of the pall of gloom that has hung over the situation since last autumn is here and there evident, and there is even the suggestion that the forces of liquidation may have spent themselves and the forces of recuperation may be about to operate."

And it is equally encouraging to find the additional statement by the same bank that "The presidential election still looms as a disturbing factor, largely imaginary, for its actual economic influence will be of little importance."

British H.P. Tax Likely to Stay Put

THE horsepower tax in England, as everybody knows, has definitely influenced the design of British cars. Objections to it have been frequent, particularly on the score that the small-engine design which the horsepower tax makes necessary in England has hindered British foreign trade in automobiles materially.

The British industry is

known to have approached the Chancellor of the Exchequer on several occasions suggesting a tax of 10 shillings per c.c. of engine capacity instead of the present £1 per h.p. on the R.A.C. rating. It is highly improbable, however, according to reports received by the Automotive Division, Bureau of Foreign and Domestic Commerce, that the treasury authorities will take any steps to change the tax at this juncture or in the immediate future owing to the substantial budget revenues derived from this source.

An Instruction Book We Can Understand

FAIR be it from us to add one more sling of mud to the thousands that have been hurled over the years at factory instruction books and service manuals for car owners. Some are better than others, but we have yet to read one which combines clarity, readability and accuracy in any high degree.

But we have read a most interesting little book called "What Every Woman Should Know About Automobiles" which might well serve as an inspiration and guide for the writing of some future instruction books. It is written with clearness in a tone of restrained humor which makes it combine entertainment with education in almost equal quantities. It's written for the layest of laymen—or laywomen rather—and is published by Simon & Schuster. Old timers among our readers will recall Max Schuster as a former automotive man; he was publicity and promotion director for the old M.A.M.A. some 10 years ago. The author of this little volume is Hunter Eaton, about whom we know nothing except that he has done a darned good job on this book. The illustrations are by Frank Beck, famous comic strip artist and creator of "Gas Buggies" and "Down the Road."—N.G.S.

"Speed" as Car Advertising Slogan

New Flood of Restrictive Road Laws

Robbins B. Stoeckel is chairman of a committee appointed by the Eastern Conference of Motor Vehicle Administrators which will meet with a committee now being appointed by the National Automobile Chamber of Commerce "for the purpose of studying the relationship between automobile construction and accidents . . . and to consider the entire question of the motor vehicle industry's responsibility in reducing accident hazards."

His views on SPEED control, therefore, ARE IMPORTANT!

He says what he thinks about speed and speed advertising in this article, which is digested from a recent bulletin issuing from the Connecticut Department of Motor Vehicles.

Read what he has to say.

Then froth at the mouth, cheer, or write a letter to the editor—as you please.

BUT don't fail to read his views, because they are going to have *some* effect on your business eventually no matter what part of the automotive industry you are connected with.

"... pick-up and performance are safety factors only when rightly used . . ."



July 23, 1932

THE invention and perfection of workmanship of the present mechanical age have brought along the car faster and developed it to a higher point of perfection for service and pleasure than the highways and the persons operating the cars have been able to meet.

Fast speed has apparently impressed itself upon the manufacturers of motor vehicles as being a primary sales argument. Whether it really is or not, nobody knows. It may even be that people buy cars manufactured for high speeds notwithstanding that fact. Probably, however, the manufacturer is justified in his idea that speed is an attractive feature to a potential buyer; so he has played it up and has educated the car market to higher and higher speeds, in the probable expectation that because high speeds seem such a desirable adjunct to pleasure and so useful in the business of the average automobilist that states will make additional appropriations, build highways for the use of faster cars and will educate their operators to drive faster.

There has been no corresponding effort, except in a most general way, to educate an operator to drive at fast speeds. The car of today is advertised and sold to a buyer on a basis of potential speeds which are usually much higher, at least in the eastern states, than anything which any ordinary operator not trained as a speed driver ought to attain on the highways as they exist.

The time will soon come when there will be restrictive legislation on the use of cars which can go faster than rates which are considered reasonable by constituted authorities under existing circumstances. Such legislation is bound to be far different from any disciplinary type which has existed heretofore. It will most likely be regulatory in character and may be expected to extend to a point where highway building is accomplished to specifications for proper speed performance.

Some student of constitutional law will say that we cannot regulate car production, claiming that to do so may be unconstitutional. Very probably to prohibit production of machinery at all for speed, or to try to limit the sales of cars on any theory that they are capable of making high speeds, might be so held. But that theory is not proposed. The correct view will be founded upon proposed general supervision of the

Automotive Industries

Will Bring

by
Robbins
B.
Stoeckel

Commissioner
of Motor Vehicles,
Connecticut

"There are 412,000 vehicle operators in Connecticut. . . . Is it conceivable that any such number of licenses to carry revolvers ever could be granted? Yet we freely license people to drive motor vehicles and these vehicles are admittedly more destructive than revolvers ever could be."



other elements which enter into every fast-speed performance.

It has been suggested that the result can be accomplished by legislative action which will direct an authority to determine the speed capacity of cars by the making of an official list, and by assigning a definite capacity of speed for each car. This is to be supplemented by an understanding as to what shall constitute a reasonable maximum speed limit which shall never be exceeded unless conditions warrant. In each instance where such a speed capacity is determined and listed which is greater than is considered reasonable by a state under any circumstances, an additional tax might be imposed. With such a plan there might be examination of operators for speed driving.

If a state were to fix 45 miles an hour as the fastest speed allowed as reasonable under ordinary conditions of traffic it could yet require as a part of every examination that an intending operator show an examiner that he can drive his car safely at speeds up to 45 miles an hour, that he has judgment enough to select

places where he is capable of operating his car at the differing speeds at his command. All modern cars will go faster than 45 miles an hour, so that if any such legislation is projected there ought to be some way in which the car buyer can assure a state when he registers his vehicle that he will make it a practice not to exceed the reasonable speed limit which the state sets as its opinion of what the maximum should be.

This whole project is a new proposal along lines of thought which may not work out, but it seems high

Stoeckel-isms

"The psychological effect of speed advertising has been bad."

* * *

"The car of today is advertised and sold on a basis of potential speeds usually much higher than anything which the ordinary operator, not trained as a speed driver, ought to attain on the highways as they exist."

* * *

"... something or other will be done which may in the end bring the desirable result that all traffic on the highway will be more alike in performance, that is, there will be no exceedingly fast or exceedingly slow speeds, no exaggerations of conduct, and driving will be done... for the welfare of everybody rather than to serve the pleasure and whim of an individual."

* * *

"The old attitude that roads must be built for speed, that operators must be trained to drive at speed, or that the state must eventually train them to do so is emphatically wrong."

* * *

"... cars ought to be classified by weight, and possibly maximum speeds be assigned."

* * *

"States are now finally beginning an actual campaign against extreme speed..."



There probably are highways upon which fast speeds can be safely used. It is known there are operators who can drive fast in comparative safety because their judgment is good, and because they have the necessary equipment to permit them to do so, but the highways where such indulgences are to be allowed, and the people who shall be allowed to do so, certainly must be selected, and that means with such care and meticulous attention as to assure the public at large that no mistakes can be made. It is the mistake by the operator of a car which has extra speed capacity to use it in a place where speed ought not to be exercised and cause an accident and possibly death. So the argument about control of cars for speed is built upon the basis of a consideration of all the elements of speed.

Exaggerations Make Trouble

As has been so often stated—it is the exaggeration of any characteristic of operation which makes trouble.

It is fair to hold that the exaggerated effort of manufacturers to sell cars on a speed basis has helped to cause a speed mania in some persons who have not the requisite judgment to discriminate.

To understand the whole problem in connection with speed is just as easy as it is to consider any other characteristic of motor vehicle operation, but to find the method of correction is an entirely different matter.

It is probable that suggestions made will be discarded and others substituted, but a study of the whole condition will undoubtedly be made by many states, and there is little doubt that *something or other will be done* which is constructive and which may in the end bring the desirable result that all the traffic on the highway will be more alike in performance, that is, there will be no exceedingly fast or slow speeds, no exaggerations of conduct, and driving will be done more by the dictates of common sense and be accomplished for the welfare of everybody rather than to serve the pleasure and whim of an individual.

"Performance" is Misused

Car capacity for speed is a latent factor the presence of which makes no difference unless it be wrongly used. It probably never will be the purpose of the state to restrict power and speed production in automobiles because power and ability to get faster speed quickly (the so-called "pick-up") are safety factors in themselves when rightly used. The fact that they are capable of misuse ought not to bar them out; but while it may be considered the duty and privilege of the car manufacturer to put out his product with increased speed capacity to an extent which may seem reasonable without consideration of the operator or highway, it certainly is the positive duty of every state to see that control is applied to the operator and to the highway.

If a car is put out with a speed capacity which is much greater than ever can be reasonable considering the capacity of the average operator and the average highway, then the use of that car must become limited by the other two factors, and, either by enforcement or by regulation, the condition which actually exists when no limitation is imposed must be corrected.

The old attitude that the roads must be built for speed, that operators must be trained to drive at speed, or that a state must eventually train them to do so, is emphatically wrong. It is proved so by the fact that car building has progressed along the lines of production for speed so much more rapidly than it has been

time that states take cognizance that these extreme speeds must be governed and controlled by means other than by police arrest and subsequent conviction for speeding.

Regulation ought to take the form of cooperative effort for safety. Manufacturers and highway builders and others who govern traffic ought to confer and try to arrive at what is *reasonable* production in each of the elements which enter into the formation of traffic. If that can be arranged, it will not necessarily mean that the limit of car production for speed has been reached, because the whole subject will always be adjustable.

possible to train operators and build the highways, until now it is an unequal proposition. The average operator even of a very small and light car has at his command what amounts to unlimited speed capacity for which the highway may be unsuited entirely and for which he may not be capable. Consequently, he is subject to the temptation to go at faster speeds than are reasonable and proper. This not only makes accidents, but causes more serious consequences in those which occur because of the fact that at high speeds the impacts are so tremendous.

Officials Reach Speed Agreement

It is curious, but nevertheless true, that there soon comes to be a consensus practically unanimous, at least among officials in charge of enforcement, of what constitutes reasonable speed under ordinary conditions in certain environments. An example of this in highway speed is that there seems to be a clear opinion throughout Connecticut among traffic authorities, probably not unanimous but one held by a large majority at least, that 45 miles an hour on Connecticut highways by the average Connecticut operator is about the maximum which can be approximately safely maintained under the circumstances as they now exist in this day and hour under average conditions. This means that the law, which is that an automobile may be driven at a reasonable rate of speed considering the environment and circumstances, is interpreted by common consent to mean that the maximum speed which is reasonable and proper under any conditions is probably not much over 45 miles an hour.

To drive a light car at its highest speeds is a hazardous proceeding unless the operator is a most skillful driver, taught for speed and experienced in it to an extent where he is justified in using it; further, that the place where this speed is exercised and the conditions which surround its use are proper for it. Under whatever conditions the slightest mistake, if extreme speed be present, the slightest failure of mechanism, the deflation or blowout of a tire, the distraction of an operator's attention for an instant, means disaster.

M.P.H. Per 1000 Lb.?

It seems to be the impression among officials that cars ought to be classified by weight, and possibly maximum allowed speeds be assigned. That is the line of thought along which motor vehicle administrators and state officials are proceeding in connection with a movement to curb the use of the extremely high speeds which manufacturers have provided for the present-day cars.

There is apparently no reason why a manufacturer should ever turn out a car capable of reaching extreme speeds until highways and operators are ready for performance.

All of which means that states are now finally beginning an actual campaign against extreme speed, not as relating to the

maker in the sense that it shall be beyond his power to make a car with high speed capacity, or that any operator shall be restricted from driving his car at reasonable speeds, but that exaggerations shall be abstained from in both of these characteristics. If it is fair to demand that the operator shall not exaggerate his speed, it certainly is fair also to require that the manufacturer shall not turn out a product with a statement of speed capacity which most operators cannot attain either because of their own incapacity or because of the lack of suitable highway environment in the territory where the cars are sold.

It seems to the writer that the psychological effect of speed advertising has been bad. It has apparently been developed as a sales argument because it appeals to a sportsmanship which is inherent in everyone. Everyone likes to go fast. As children we began to coast down hill, roller skate, ride bicycles, and do everything we could to attain speed. The sensation of speed is pleasant, but overindulgence in this form of pleasure is a grave danger, so when it becomes a part of duty to make decisions as to a practice which is capable of inflicting great injury and damage, then to curb natural inclinations to whatever extent may be requisite for reasonable performance becomes imperative.

Revolvers vs. Cars

A simile which is sometimes employed might be thought ridiculous in its terms, but is perhaps not so in its actual comparative worth. There are 412,000 operators in Connecticut. Supposing each one of those operators took out a license to carry a revolver. Would it not be fair to inquire pretty carefully as to how far those revolvers would shoot and where they were to be used, how handled, and then to limit their use? Is it conceivable that any such number of licenses to carry revolvers ever could be granted? Yet we freely license persons to drive motor vehicles and these vehicles are admittedly more destructive than revolvers ever could be.

Somebody will want to say that the Commissioner of Motor Vehicles has plenty of power—let him put any examination he wants to into effect. That is exactly what the state is now attempting, but to do this requires an accumulation of education in the motives and in the characteristics of people and a forceful public sentiment.

To go back again, even out of 412,000 revolver permits, probably the percentage of 85 per cent safe users might hold, and the other 15 per cent would do the damage just as in the case with motor vehicles. The manufacturer of a motor vehicle and his product seems to justify the statement that if he were a manufacturer of revolvers supplying these 412,000 people, it would be fair to claim in comparison with the way in which the motor vehicle has been equipped for the use of the operator that he offers a revolver equipped with a hair trigger.



Are we headed toward state control of car speeds, weight and other design factors? ?

Write, if you have some thoughts on this subject, presented by Mr. Stoeckel. !

Dunlop Pneumatic Brake for Aircraft

Annular Rubber Container of 715 cu. in.

Stream-lined, dust-proof assembly is extremely light in weight, and is designed with a five-to-one safety factor for air pressure in container

BRAKES on the landing wheels have come to be recognized as a great help both in taking off and in landing airplanes, and a number of designs have been developed in which the requirements of light weight and minimum drag have been duly considered. A pneumatic brake, operated by compressed air from a pressure vessel, has been developed by the Dunlop Rubber Co., Birmingham, England, and the following particulars of this brake, together with the illustrations, are taken from *Engineering* of London. The design is somewhat reminiscent of a brake for automobiles which was launched by an American axle manufacturer some years ago, in that it contains an annular rubber air chamber, which rests in the base of a ring of U section. The brake blocks, of which there are six, form a ring outside the air chamber and are held in place by two lugs passing through slots in the U ring. Each of the lugs is provided with a slot near the end, and the blocks are pressed against the air chamber by springs, whose ends engage with the slots in the lugs, and making contact at the center with the inside face of the wheel flange, to which the U ring is attached. No provision is necessary for wear on the

brake linings, as the resultant difference in diameter is taken up by a slightly greater expansion of the air chamber. The springs which hold the brake blocks in position can be released by the fingers, so that a new

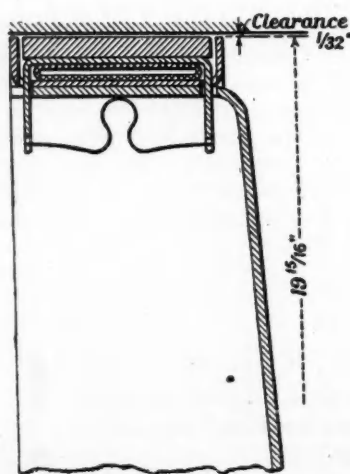


Fig. 1—Section through brake drum, air chamber and brake shoe

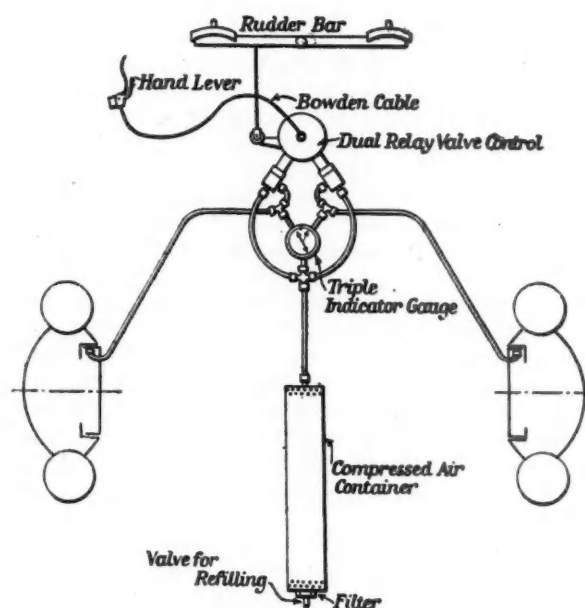


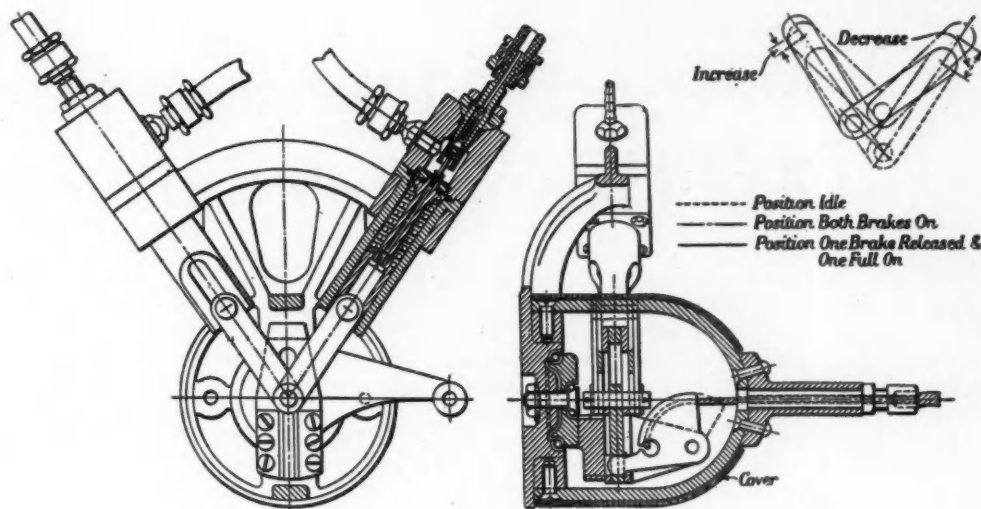
Fig. 2—Diagram of complete braking system

block can be inserted without tools in a few minutes. All the brake parts are in effect sealed inside the wheel to produce an efficient stream-lined assembly, and to protect the various parts from sand or dust. The air chamber is designed to resist the action of heat, and we understand that prolonged braking tests, in which the temperature of the brake blocks reached 840 deg. Fahr., had no detrimental effect on the rubber compounds from which it is made. The relief springs effectively prevent rubbing when the brake is released.

The system consists essentially of a container for compressed air, the two wheel brakes, and a relay control valve. The air is delivered from the container to the connections at the top of the two diaphragm boxes shown in the top view of the control

Employs Capacity

Fig. 3 — Control valve in end view and section



valve, the connections to the air chambers in the wheels being taken from the sides of the boxes. The rudder bar is coupled to the lever of the control valve, and the brake is operated by a hand lever connected by Bowden wire to a quadrant. The operation of the control is as follows: Assuming that the rudder bar is in the "dead-ahead" position, the elements of the control system will be in the position shown in Fig. 3. If the hand lever is now moved, the quadrant will be swung upward, and will raise the slide shown in both figures. Two links are pivoted on the slide at their lower ends, their upper ends being connected to the lower spring seatings shown in Fig. 3, left-hand view, which slide in guides under the diaphragm boxes. The movement of the hand lever will therefore raise the spring seatings, putting the springs into compression and distorting the rubber diaphragms, which in effect constitute the upper spring seatings. One of the diaphragms is shown on the right in the left-hand view of Fig. 3.

Uses Schrader Valves

When the diaphragms are distorted, the inlet valves in the connections to the air container are opened by the upward movement of the small valve rod connected to the diaphragms. The inlet valves are of the well-known Schrader type. When the valves open, air passes to the chambers in the wheels, and the pressure in the diaphragm chambers rises until it overcomes the spring pressure, when the valves are again closed. Any further movement of the hand lever increases the spring compression, so that the valves reopen and the brake pressure is correspondingly increased. To release the brakes, the hand lever is moved in the opposite direction, thus lowering the spring seatings. The pressure of the air in the diaphragm boxes will then distort the diaphragms in the downward direction against the reduced spring pressure. It will be observed that the inlet valve stems terminate at the bottom in small mushroom valves sealing a central passage through the spring housings. The mushroom valves constitute the exhaust valves, and when the diaphragms are distorted in the downward direction the seats leave the valves and allow the air to escape through the central passage. When the hand lever is moved completely

back, the inlet valves are left closed and the exhaust valves just open. The hand lever can be mounted in any convenient position in the cockpit, such as on the joystick, and only requires a light finger pressure to operate it.

Any movement of the rudder bar from the central position results in the rotation of the slide in the relay control valve, the slide bracket being mounted on ball races, as shown in the sectional view of Fig. 3. The rotation of the slide will not affect the position of the links connected to the spring seatings with the hand lever in the "off" position, as they are pivoted on the center of rotation. Any movement of the rudder bar while flying, therefore, does not affect the brake gear. If, however, the hand lever has been moved, rotation of the slide releases one brake, while increasing the pressure on the other, the position taken up by the links in these circumstances being shown in the upper right-hand corner of Fig. 3. The action is progressive, and as the rudder bar is moved to steer the machine to the left or right, the braking effect steadily increases on the inside wheel and decreases on the outside wheel, until in the extreme position of the bar the brake is entirely released on the outside, and any degree of braking desired can be obtained on the inside wheel by operation of the hand lever. The differential system is stated to have been thoroughly tried out under the most severe service conditions. There is just sufficient stiffness in the relay valve springs to give the pilot the feel of the brakes. The necessity for ground crews to handle the craft after landing is said to be entirely eliminated, as the largest machine can be taxied under its own power to its position in the hangar without external assistance.

The outer casing of the compressed-air container is made of light alloy extruded tube, with pressed end plates, so that the container is very light. As indicated in Fig. 2, a filter is provided on the inlet. The valve cap is of the Schrader "Douscheck" type, so that it is not necessary to remove it when charging the cylinder. The working pressure is 200 lb. per sq. in., but the container is tested at 1000 lb. per sq. in. and can be safely worked at 400 lb. per sq. in. The 20-in. wheel unit weighs 9 lb. 14 oz., the relay valve 4 lb., and a container of 715 cu. in. capacity, 9 lb. 9 oz.

Sperry Develops Flaw Detector Having Automotive Possibilities

AN electrical method of non-destructive testing developed primarily for the detection of internal transverse fissures in rails seems to hold some interesting possibilities in the testing of certain automotive products. Refinements in the original apparatus and the study of new applications are being carried on by the research staff of Sperry Products, Inc., Brooklyn, N. Y.

The Sperry electrical method of inspection may be applied to any magnetic material or electrical conductor. So far it has been used for the testing of forms of uniform cross-section, such as tubing, bar stock, steel rail, etc. There is a possibility of applying the method to such forms as the crankshaft, a steering knuckle, or an aircraft connecting rod.

The method depends for its operation upon the fact that electrical current flowing through a section is compelled to pass around a fracture, inclusion, or separation lying in the path of the current. When a section is sound the axis of current is substantially straight, but if a fissure is encountered the current axis is displaced.

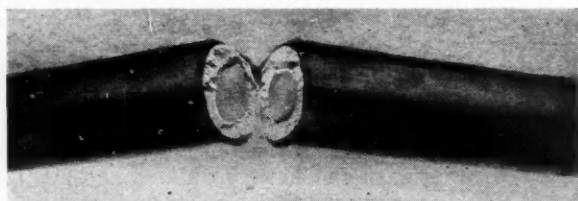
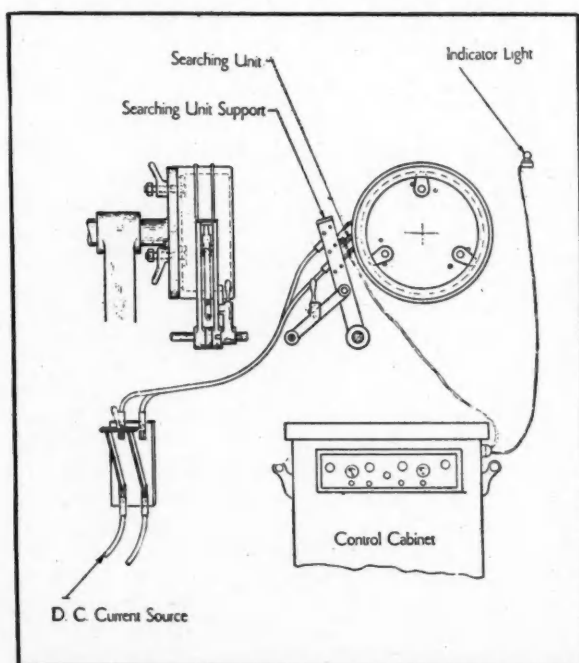


Fig. 1—Sperry electrical flaw detector locates bad section in a specimen of bar stock for an axle shaft. Cupping, which would have caused failure in service, is discovered upon breaking the bar at the point indicated

Fig. 2—Special adaptation of the flaw detector with a searching unit designed for the examination of centrifugally-cast brake drums. The unit spots inequalities in bonding between the steel shell and cast iron, thus serving not only as a testing machine but as a means of controlling a new process



An inductive searching unit device is mounted directly over the rail head in the path of the magnetic lines of force surrounding the work. In the case of a sound bar carrying current, the flux around it is uniform and no e.m.f. is generated as the inductive searching unit passes along. However, when the axis of current is deflected as at a fissure, there is a corresponding deflection in the flux which results in the generated potential at the terminals of the searching unit. This potential is amplified and led through relays connected to recorder pens, thus giving a record of the received impulse. In certain applications it has been found desirable to substitute contacts for the searching unit.

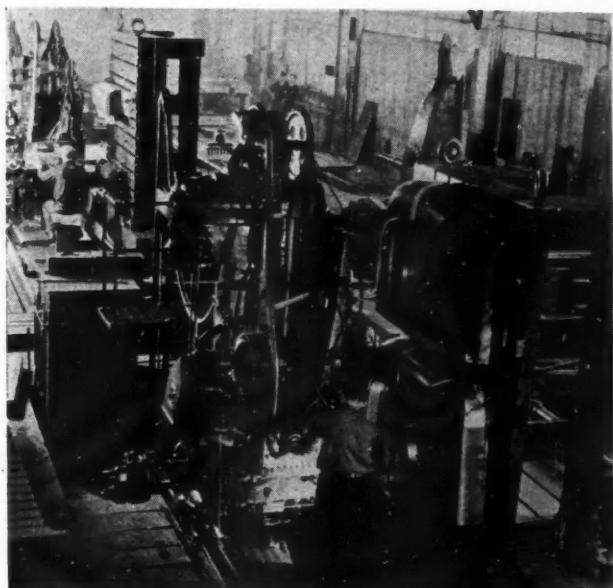
Several set-ups worked out for automotive products may give the production man as well as the metallurgist some food for thought in their own operation. One of the simplest applications is for testing bar stock prior to fabrication into truck axle shafts. Production was carried on, about 20 tons being tested per day using one testing machine. The type of defect found is known as cupping, an internal transverse separation, illustrated in Fig. 1.

In testing drawn bars for cupping, current is passed longitudinally along the bar and the searching unit is moved along the bar from one end to the other. If an internal crack is present the deflection of current at that point produces an input to the amplifier which in turn operates a signal light or recording pen. With the proper set-up the bars may be tested at a speed of 10 ft. per second.

Tests have been made with modified equipment to locate longitudinal seams in bar stock.

In a railroad shop, the method has been employed to examine heavy car axles for fatigue cracks. By means of the apparatus, a heavy alternating current is applied to the axle by means of contact heads mounted in a lathe.

Perhaps one of the most interesting jobs handled by the Sperry method recently is that of inspecting the now familiar centrifugally cast brake drums. Here the problem was to determine the condition of the bond between the shell and the cast iron, a faulty bond resulting in a lamination. The set-up shown in Fig. 2 was used, current being introduced through the fingers of the searching unit. As the brake drum is revolved on the fixture, the searching unit picks up any defects in the bonding. These are recorded on a record tape by means of pens which are fed along by a lead screw. Defects appear as breaks in uniformly drawn lines.



PRODUCTION LINES

Production Lines of the Industry No. 15

Keller machines of the latest type used by the Briggs Manufacturing Co., Detroit, in machining large body dies of either cast iron or steel, develop a cutting speed three times faster than the first machines installed for this particular kind of work. Briggs, one of the largest independent manufacturers of automobile bodies is said to have installed one of the first Keller machines used for large body dies.

For Automatic Threading

Technical details of the Landis line of threading machines and die heads have been assembled in a new catalog just off the press. Anyone interested in production threading—and who isn't?—can get a copy on request.

Fair Day's Work

What is a fair day's work? This was asked S. M. Lowry at the Silver Bay Industrial Institute last week. To eliminate industrial disputes between labor and management, some one ought to define "a fair day's work" so as to set a definite standard of accomplishment. Then each man could get a return commensurate with his output. It would be interesting to hear from people who have been experimenting with management problems of this fundamental character.

Explains Concrete

Do you want the latest dope on the procedure for good concrete work? You'll find it in Eng. Bull. No. 27, "How to Avoid Faulty Concrete in Small Structures." Pub. by the Engineering Extension Dept. of Purdue Univ. Discusses materials, proportions of mix, methods of mixing, etc.

Steel Price Extras

The fourth edition of the Standard Handbook of Steel Price Extras is ready for the purchasing agent and others interested in the special service it brings. It is devoted chiefly to extras and differentials

applying to steel products. Here and there are generous gobs of information concerning specifications, mill tolerances, etc. A valuable section of this handbook is the one devoted to product data. Notes various steel mills, their products, and available size ranges. Pub. semi-annually by the Daily Metal Trade. Price, one dollar.

Production Men

This is your page.

Any suggestions you have on new methods or kinks may be of value to men in other factories.

If you are working on some new development, we'd like to know about it—even if not for publication with your company's name.

Handled With Gloves

In the final wiping of sheet metal parts at Oldsmobile, operators wear white gloves to keep perspiration off the clean metal surfaces, thus eliminating one of the most prolific causes of rusting. It is claimed that gloves are changed as much as four or five times a day, proves that there's more than one way of killing a cat.

Proof of the Pudding

Chrysler is so pleased with the new "Eutectrol" process of continuous gas carburizing that they have installed another furnace at the New-

castle plant. The Eutectrol process furnace is made by the Surface Combustion Co. This is the third unit installed by Chrysler and will be used for carburizing camshafts.

Recording Gear Quality

To a long list of technical literature devoted to improving gear quality, The Fellows Gear Shaper Co. adds a new edition of *The Red Liner*. It is considerably amplified and now contains material on the inspection of spur, helical, internal, and face gears. Among other things, the booklet describes the use of the Red Liner instrument in measuring the improvement in quality between a gear which has been finish-cut, hardened, and refined by lapping.

Stopping Water

A correspondent asks whether readers of this column have had any experience with dirt and water in anti-friction bearings of machine tools. He has found that failures are attributed to a lot of things—some obscure—whereas in reality the initial corrosion that started everything had disappeared without leaving a trace. In this connection we learn that a manufacturer of oil-feed systems for machine tools is on the trail of something that sounds mighty good. It's a filter oil cup designed to trap both dirt and water. The development is still in the experimental stage. But the maker would be interested in any comments you may have to offer.—J. G.

Designs Steel Frame For Diesel Engines

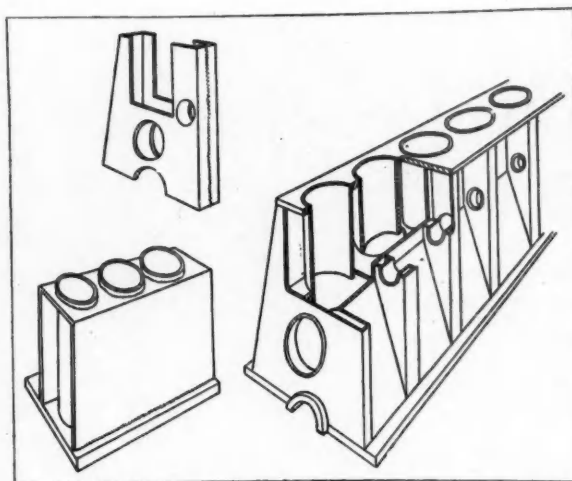
A DESIGN of steel frame for Diesel engines has been developed by Lukenweld, Inc., Coatesville, Pa., and some of the details thereof may be seen from the illustrations herewith. Steel has an advantage over cast iron for engine frames in that it is stronger and has about twice as great a modulus of elasticity, hence for the same strength and rigidity a steel frame can be made much lighter.

In automotive engines it is customary to "hang" the crankshaft from the top half of the crankcase or the combined cylinder block and crankcase, but in marine work this plan is not practical. Owing to the limitations of space in many marine installations, it is advisable to so arrange matters that the entire upper part of the engine can be removed for an overhaul, letting the crankshaft rest in its bearings in the lower half of the case.

There is also considerable variation in practice with respect to the location of the camshaft. It would facilitate the design of a welded steel frame structure if the camshaft were located on top of the cylinders. But an overhead camshaft engine is undesirable in marine practice because the top of the engine generally is near the roof of the engine room and the valve-actuating mechanism, including the rocker arms, would be hard to get at. The drive of an overhead camshaft also involves some difficulties. In automobile engines the favorite location for the camshaft is in the crankcase, some distance above the crankshaft and to one side, where it is accessible and where the cams, etc., are lubricated automatically. The camshaft drive is then a comparatively simple problem. An objection to this location of the camshaft from the welded-steel-frame point of view is the necessity of cutting holes in important structural members, which naturally lessens their rigidity. If a water box or water jacket for the cylinders is incorporated in the main frame, it is difficult to assure that it will be water-tight when the frame arrives at the engine manufacturer's plant, since there is usually very little opportunity to test for water-tightness before the frame is assembled and machined.

It is the belief of the Lukenweld engineering department that the construction shown by the sketches will satisfactorily meet all of the various requirements. The sketch in the lower left-hand corner shows the welded water box, which is built up as a separate sub-assembly, and as such can be tested for leaks. The box is shown upside down to show the liner protruding from the bottom plate. The liner shown is of the dry type, which is favored in automotive practice. In heavy marine work, on the other hand, where cylinders of large dimensions are involved, the wet liner is preferred, for the reason that the double cylinder walls obtained with dry liners are rather poor heat conductors. The liners are generally made of cast iron, and in the latest practice nitrided steel is sometimes used.

The water box is of very simple construction, being



Lukenweld steel Diesel engine frame

made of a bent plate, to eliminate a number of welded seams, and the top plate, to which the cylinder head is bolted. With the water box fabricated as a sub-assembly it is possible to provide a nickel-clad water box, using Lukens nickel-clad steel. An advantage of this material for marine work is that nickel is highly resistant to attack by salt water, and in many marine engines salt water is pumped through the cylinder jackets.

The remainder of the structure consists of a number of frame members of the type illustrated by the sketch in the upper left-hand corner. These frame members can be made either double, in which case they are made of two plates bent into U form and welded together, or they may be made single. In the former case tie rods may extend through the hollow frame members and the cylinder head may be tied to the lower half of the crankcase, while in the latter case the bearing caps are held by studs or bolts to the single frame members. The camshaft may be inserted through openings punched in the frame members, as indicated in the sketch, or it may be placed elsewhere, if the design of the engine requires. All frame members are sub-assemblies and can be accurately made, the manufacturer claims. In quantity production the entire engine frame could be made on the press.

After the various frame sections and the water box have been completed, and the water box has been tested for leaks, all of these parts are assembled with the bottom flange and welded into a complete engine frame. Closing plates are applied between the frame members and contribute much to the longitudinal stiffness of the engine structure.

The view on the right shows an engine with a "hung" type of crankshaft as used in automotive practice. This results in a considerably lighter engine than where the crankshaft rests on the lower half of the crankcase, and since the tendency in Diesel engines is toward lighter construction, it is believed that the "hung" type will be generally favored.

Owing to the high compressions employed in Diesel engines, the shock loads on their frames are much greater than those on the frames of gasoline engines, and it is believed by the Lukenweld engineering department that the construction shown in the perspective sketch affords a simple, inexpensive frame which is pre-eminently adapted to the stress conditions in Diesels.

Over-Capacity Belt Drives Are Recommended

Momentary starting and emergency overloads while running make severe demands of belts loaded to capacity



Rockwood "Uni-Pull" belt-drive equipment mounted on truck

A BELT which will carry 10 hp. is not necessarily suited to a 10 hp. motor. The momentary overloads during starting and running determine the belt drive needed. Too often a belt drive is proportioned from consideration of average running conditions. This accounts for a large proportion of all trouble encountered.

Fully one-half of belted motor applications require a heavier belt for starting than for satisfactory running. Practically all three phase A.C. motors which start on the line, and many D.C. motors, develop from $1/3$ to $1/2$ more belt pull at starting than when operating at full rated load. Wound rotor motors sometimes, and high slip linestart motors (high resistance rotor motors) always, develop *twice* normal full load belt pull at starting.

If the capacity of a drive planned with motor manufacturer's standard pulleys must be increased because of extreme load peaks or for any other reason, *what can we do to the drive?* There are a number of expedients which will help in such cases.

Where the smaller pulley of the drive is not paper, an increase of 25 per cent in drive capacity may be obtained by installing a paper pulley. However, in speed-up drives the driven pulley is the smaller and should also be paper. Even on drives where the driven pulley is the larger, a worth while improvement in capacity and a decrease in slip may be obtained by substituting a split paper *driven* pulley where the driven pulley is not more than three times as large as the driver.

The faster a belt is run up to 5000-6000 per minute, the more horsepower it will carry. Above 4500 ft. per minute the gain in horsepower is not large.

Higher belt speeds may often be used where the drive carries the load satisfactorily, but the motor bearings heat dangerously. By substantially increasing the belt speed a narrower belt may be used, or the old belt run slack and the bearings greatly relieved.

"Let's put on a wider belt." This is ordinarily the solution which first comes into one's mind when a belt drive operated at reasonable tension will not start the load . . . or fails to carry the extreme load fluctuations.

With motor belts this ordinarily is *not* the best solution for the problem.

With a smaller pulley belt life is shortened. By using special, extra-flexible belting you can avoid this, at least in part, if the pulley is not too small. If the pulley diameter is to be decreased the belt must be wider and in about the same proportion. As this is ordinarily expressed *the product of pulley diameter and face width should be kept the same as for the standard motor pulley*. If this cannot be done, then a pivoted motor base or gravity idler is generally advisable.

These two types of drive are particularly useful when motor drives must be installed on very short centers. In fact, if with short centers is combined a considerable difference in pulley size, some such special drive is almost a necessity.

The pivoted motor base drive greatly reduces the pulls on both the tight and the slack side of the belt at all loads except extreme overloads.

Even at extreme overloads it affords considerable relief for it makes it unnecessary to strain up the drive tighter than is needed for operating requirements in order to allow for subsequent stretch. The motion of the pivoted base takes up the stretch.

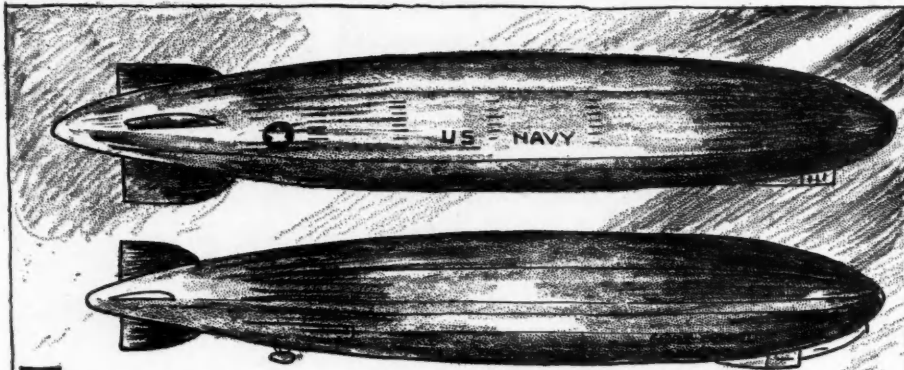
A New Storage-Battery Couple

A NEW secondary cell intended to overcome some of the difficulties experienced with lead acid cells was described in a recent communication to the French Academy of Sciences by Francois Boissier. In this cell a carbon absorbent soaked with zinc iodide is packed around a central rod of carbon, the whole being contained in a zinc shell which serves as an electrode.

In Boissier's invention the charging current decomposes the zinc iodide to zinc and iodine. The zinc is deposited on the outer shell and the iodine collects on the central carbon rod. Recharging recombines the zinc and the iodine into zinc iodide, so that the cell is ready to give out more current.

It is evident that this new storage cell has no corrosive liquid (electrolyte) to spill, nor do the two elements rot away. Because of the carbon rod, the cells can be made very long and of small diameter.

Automotive Oddities—By Pete Keenan



THE "AKRON" IS ONLY 9 FT LONGER THAN THE GRAF ZEPPELIN YET IT HAS A CUBIC-FOOT GAS VOLUME NEARLY TWICE AS MUCH. WHY?



A FASHION DESIGN SUGGESTED FOR 1933.



MOTOR "RACKET" 1910 AN IOWA FARMER PIPED WATER ON TO A ROAD TO KEEP IT SOGGY, THEN CHARGED MOTORISTS \$5.00 TO BE TOWED OUT



A MOUNTAIN OF OLD TIRES AT COALPORT, ENGLAND, DESTINED TO BECOME DOORMATS.

The NEWS TRAILER

Write us if you know an oddity

Despite retrenchment Studebaker was one of the largest purchasers of newspaper advertising during 1931, with 3,590,091 lines. This was surpassed only by Chevrolet and Ford and the four leading makes of cigarettes.

A Los Angeles judge dismissed charges against William Donnelly, rancher, who drove through a stop-light when the rancher explained he was used to driving mules and when he hollered, "Whoa," the auto kept right on going.

Venice, Italy, has just had to make one of the most delicate decisions in her long history—what to do when the automobile reaches the city of lagoons.

Venice has 261,000 persons, but only 408 own cars, which they keep on the mainland, two miles away. But an automobile bridge is being built now to con-

nect Venice and the mainland, and that gives rise to the problem.

One city father said: "Let us build a nine-story garage with a capacity for 2500 machines."

Everyone thought it a grand idea. They had plans drawn and decided to place the garage near the railroad station, hidden behind a row of houses. Then they began to think it over. "The automobile won't be as popular here as you think, because it can't be used in the city at all. All it can do is to cross the bridge and park in the city garage and its occupants can betake themselves home as they always have done, in the gondola."

Finally they compromised. They would build a garage with space for 1000 machines, including 474 private compartments, and \$250,000 was voted to finance the construction.

The city will have a monopoly of the garage business so she should get back her investment before long.

July 23, 1932

Automotive Industries

NEWS

Press Can Lead To Readjustment

Alfred P. Sloan, Jr., Tells Editors Distribution Has Failed Amid Plenty

SAN FRANCISCO, July 19—Publications, in the opinion of Alfred P. Sloan, Jr., should lead the country to an economic recovery by first facing unpleasant facts and then proposing remedies.

The message of the president of the General Motors Corp., read before the convention of the National Editorial Association, stressed that "the largest single job facing industry is to get men back into productive employment."

While the malady of depression has been severe, he declared, Americans still have the inherent desire for higher standards of living and the future rests on this and other universal human desires.

"It requires no great study," he went on, "to see that the enormous impetus given to mass production during the war has resulted in an apparent overcapacity for production of all of the things needed to sustain or enrich life."

"We have overcome the doctrine of Malthus, who believed that population would outrun the food supply. This is a surplus depression. Production of food or goods is no longer our great problem."

"But when, alongside of surpluses of every commodity, we see on all sides all over the world millions of people who are deprived, not alone of the comforts, but of many of the necessities of life, then it becomes evident that a fault has developed in our system of distribution."

"In the laboratory and in the field we have learned how to produce at a lessening cost in terms of both dollars and of human energy. But we have made these advances so rapidly that our facilities for getting these products into the hands of those who need or want them temporarily have broken down."

He declared many things could be done to quicken the recovery and that first among them was the restoration of confidence.

"In the laboratory and in the field, we have learned how to produce at a lessening cost in terms of both dollars and of human energy," Mr. Sloan wrote. "But we have made these advances so rapidly that our facilities

(Turn to page 120, please)

Truck Interests Fight New Taxes

Pennsylvania Solons and Railroads Seek to Raise Relief Funds from Truckers

HARRISBURG, July 19—Trucking interests from all parts of Pennsylvania today told the House Ways and Means Committee the Staudenmeier truck tax bills would tend to destroy their industry, increase unemployment and cause a considerable drop in state revenue.

These bills are said to be the first state laws proposed to tax motor vehicles and truck operations to raise unemployment relief funds.

State officials and representatives of railroads and railroad labor unions countered with arguments that the bills would bring equitable competition between the railroads and trucks, would make highways safer and increase revenues.

Several hundred truckmen shouted and cheered as David McAllister, representing the Washington-Lawrence County Trucking Association, said the bills would legislate \$75,000,000 worth of trucks from the highways and cost the state upwards of \$6,000,000 in gasoline taxes.

Senator Horace M. Schantz claimed the bill would add greatly to unemployment, both of truck drivers and employees of plants manufacturing trucks and accessories. He represented the Motor Truck Manufacturers' Association. Passage of the bills also would seriously affect institutions which have financed truck owners, he claimed.

Harold S. Shortz, of Philadelphia,

representing the Pennsylvania Motor Truck Association, added that he believed the bills would wall off Pennsylvania industrially. Trucks from this state, of smaller size, because of the tax on heavy trucks, he claimed, would be unable to compete with foreign trucks in distribution of Pennsylvania products in other states.

The bills propose a new scale of license fees upon trucks, ranging from \$16.50 to \$350, and increase the gross receipts tax on trucks and buses.

Packard Names Gilman Sales Vice-President

New York Packard Sales Chief Succeeds H. W. Peters

DETROIT, July 21—M. M. Gilman, former vice-president in charge of sales of Packard Motor of New York, has been appointed vice-president in charge of distribution Packard Motor Car Co., succeeding H. W. Peters, who resigned last week. Mr. Gilman has been with Packard about thirteen and one-half years.

Show Heads Plan For 14 Auto Shows

Managers Association Hears Hoffman, Reeves, Berrien

CHICAGO, July 20—Plans for the year's auto shows in fourteen cities of the United States and Canada were made Monday at the convention of the International Association of Automobile Show and Association Managers at the Blackstone Hotel here.

Paul Hoffman, president of the Studebaker Sales Corp. of South Bend, Ind.; Alfred Reeves, manager of the National Automobile Chamber of Commerce, and William P. Berrien, of the Philadelphia Automotive Trade Association, were the principal speakers during the meeting.

Kelso is Manager of Detroit Forging

A. R. Kelso, formerly works manager of the Muskegon Plant, Continental Motor Co., has been appointed vice-president and general manager of the Detroit Forging Co., succeeding E. R. Wegener, formerly president and general manager, who recently resigned.

Before his connection with Continental, Mr. Kelso was for four years master mechanic of the Hudson Motor Car Co.

Borg-Warner Obtained Large Share of Business

CHICAGO, July 20—Borg-Warner Corp. has obtained a relatively larger share of available automobile business during the first six months of the year than in 1931, Charles S. Davis reports.

While there has been less business, the company has obtained 12 per cent more of the total than it did last year.

'Terraplane' Is Formally Named

Amelia Earhart is Star at Elaborate Christening of New Hudson-Essex Car

DETROIT, July 21 (*Special*)—While thousands of Detroiters applauded, Amelia Earhart today christened the Essex Terraplane, announced today by the Hudson Motor Car Co. to sell in the lowest price class.

Governor Wilbur M. Brucker of Michigan, Mayor Frank Murphy of Detroit and leading manufacturers were among the honor guests.

Immediately following the christening Hudson-Essex distributors and dealers from all sections of the United States started the biggest driveaway parade of new automobiles ever staged. More than two thousand drivers and cars participated. If placed end to end these cars would have formed a single line more than six miles long. Dealers drove the demonstration cars to their home cities, some of them driving in caravans hundreds of miles to Salt Lake City, San Antonio, Boston and New York.

The Terraplane christened at today's ceremonies was car No. 1, off the production line and in a few days it will be formally presented to Orville Wright of Dayton, Ohio, inventor of the airplane. Mr. Wright previously previewed the new car two weeks ago in Detroit.

Today's ceremony also signaled the recent returning to work in the Hudson factories here of additional thousands of workers. Not in years has Detroit participated so wholeheartedly in the introduction of a new automobile, despite the fact that many new automobiles are designed and manufactured annually in this city.

"By bringing a new and unusual value to the lowest price automobile field," President McAneeny stated, "we believe we can assist in breaking the dam which has been holding back motor car buying."

Dealers and distributors from United States and Canada began arriving here yesterday in more than 300 special pullman cars. They were met at the railroad station by bands playing their home-state music and this morning they were taken in big buses to Hudson-Essex field, near the company's factories, where the christening ceremonies took place early this afternoon. Captive balloons and huge banners marked the location on the driveaway field of cars to be driven to the various states and large cities. Hundreds of city police and banners and placards pointed the route of the parade through the city.

Similar christening festivities were held today at Tilbury, Ontario, the home of the Hudson Motor Car Co.,

Ltd., of Canada. Simultaneous driveaways were held today from Tilbury and from San Francisco, Los Angeles and Seattle on the Pacific Coast. Dealers from all parts of Canada, after attending the ceremony in Detroit, attended the later ceremony at Tilbury and participated in the Canadian driveaway.

Complete description of the Essex Terraplane begins on page 97 of this issue.—Editor.

Winans is Chief Engineer of Federal

Succeeds Ingersoll as Head of Truck Co. Department

DETROIT, July 14—E. W. Winans has been appointed chief engineer of Federal Motor Truck Co., succeeding George B. Ingersoll, who resigned July 7. Winans has been with Federal 16 years and recently has been in charge of design and engineering on special equipment.

E. O. Holmgren, recently with La France-Republic, has been appointed experimental engineer of Federal.

Edwards is Head of Universal Products

Allen F. Edwards has been elected president of the Universal Products Co., Inc., to fill the vacancy caused by the death of J. B. Flick early in March.

Mr. Edwards was formerly vice-president and treasurer of the Detroit United Railway prior to the purchase of the city lines by the city of Detroit. He is a director of First Wayne National Bank, Chrysler Corp. and was formerly a director of Murray Corp. of America.

Kermath Takes Schwartz Cycle Engine License

NEW YORK, July 21—Jervis R. Harbeck, president of Fuel Oil Motors Corp., owner of the Schwartz Cycle, announced yesterday that the company had just concluded new license contract arrangements with the Kermath Manufacturing Co.

Chevrolet Cuts Detroit Prices

DETROIT, July 20—Chevrolet dealers in Detroit area have reduced delivered prices by reduction of \$18.00 in handling charge and elimination of number of accessories usually included in delivered price such as radiator ornament, metal tire covers, etc., etc.

Jacob Reuter Dies

DETROIT, July 20—Jacob Reuter, father of I. J. Reuter, Buick president, died in Indianapolis Monday.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

NEW YORK, July 21—Retail trade last week was in the midsummer slump. Even in normal years this is a dull time in retail markets, but this year, of course, it is very bad. Considerable encouragement is based on the better tone in the stock and bond markets and strengthened commodity prices. After the recent advances, some commodities have reacted moderately. This is particularly true of grain and cotton. At one time last week hog prices were the highest since last September.

FREIGHT LOADINGS DECREASE

Railway freight loadings during the week ended July 2 totaled 489,273 cars, which marks a decrease of 9526 cars below those during the preceding week, a decrease of 178,357 cars below those a year ago, and a decrease of 302,780 cars below those two years ago.

RESERVE BOARD INDEX DOWN

The Federal Reserve Board's adjusted index of department store sales during June stood at 70, with the 1923-25 average as 100, as against 73 during May, and 75 during the first six months of this year.

NEW YORK EMPLOYMENT OFF

New York State factory employment dropped 3.4 per cent during the May to June period, which is the sharpest decline for that period on record. The decline was general, affecting most major industrial groups, with the exception of foods and tobacco, furs, leather and rubber goods.

COTTON CONSUMPTION DOWN

Cotton consumed during June amounted to 367,463 bales, including linters, as against 382,617 bales during May and 515,697 bales a year ago.

CRUDE OIL PRODUCTION

Average daily oil production for the week ended June 9 amounted to 2,152,550 barrels, as against 2,104,800 barrels for the week before and 2,544,650 barrels a year ago.

FISHER'S INDEX UP

Professor Fisher's index of wholesale commodity prices for the week ended July 16 stood at 60.2, as against 59.6 for both the week and two weeks before.

BANK DEBITS OFF

Bank debits to individual accounts outside of New York City during the week ended July 13 were 34 per cent below those a year ago.

STOCK MARKET STRONGER

The stock market last week gained strength, and prices showed a rising tendency. The stock market was chiefly influenced by the better tone in the bond market, and several new bond issues were well absorbed. Most issues registered net gains for the week. The volume of trading was light, approaching a million shares on only two days.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended July 13 showed increases of \$16,000,000 in holdings of discounted bills and of \$20,000,000 in holdings of Government securities. Holdings of bills bought in the open market declined \$15,000,000. The reserve ratio on July 13 was 56.3 per cent as compared with 56.3 per cent a week earlier and 57.2 per cent two weeks earlier.

Du Pont Earns 27c Share in Quarter

Previous Quarter Report Showed 74 Cents a Share: Like Period, 1931, \$1.23 Was Earned

NEW YORK, July 19—E. I. du Pont de Nemours & Co. issued a preliminary report yesterday for the quarter ended on June 30, which showed that the company earned 27 cents a share on 10,814,210 shares of common stock, the average number outstanding in the period.

The earnings included dividends from the company's investment in General Motors Corp. common stock, which amount to 23 cents a share on du Pont common.

In the preceding quarter total earnings applicable to the du Pont stock amounted to 74 cents a share, and in the second quarter of 1931 to \$1.23 a share.

Du Pont-Raskob Reported Buying Into Checker Cab

NEW YORK, July 20—The Associated Press reports that interests closely identified with the du Pont-Raskob group had acquired an interest in the Checker Cab Mfg. Co.

The election of three new directors was announced today. They were William Freiday, of South Orange, N. J., a member of the staff of Governor A. Harry Moore, of that state; G. Ray Kaiser, said to represent Wilmington, Del., interests, and Lervis F. Huttonlocker, of New York.

In addition to Mr. Kaiser, R. W. Ellis, who is said to be closely associated with some of the du Pont interests, and who was recently associated with John Raskob, is also a director.

Buckborough is Promoted by Reo

C. C. Buckborough has been named assistant manager of the factory retail branch of Reo Motor Car Co., in Detroit.

Mr. Buckborough comes from Los Angeles, where he has acted as passenger car sales manager for the Los Angeles store. He has been connected with Reo in various capacities since 1920.

Bohn Shows Slight Loss

DETROIT, July 19—Bohn Aluminum and Brass Corp. has reported net loss of \$763 after charges, including depreciation, for quarter ended June 30, compared with net loss of \$73,201 in the first quarter and a net profit of \$488,261 in the second quarter last year.

Net loss for the six months ended June 30 totaled \$73,964 against a net profit of \$925,557 for the first half of 1931.

Kaye Don Drives Boat 2 Miles a Minute, Setting New World's Record of 119.81 m.p.h.



Lord Wakefield (left) receiving the newly-built Miss England III when it was completed recently in London, soon after it was secretly launched. Kaye Don, speedboat and race car driver, who just set a new world's speed boat mark (center), and Sir John Thornycroft are seen with the owner of the craft

LOCH LOMOND, SCOTLAND, July 18—Kaye Don drove his newly built Miss England III to a new world's speedboat record this morning here at the official rate of 119.81 m.p.h. average for two laps over the measured mile course.

On his run with the wind he clocked 120.05 m.p.h., thus becoming the first man to travel faster than two miles an hour on water.

The new record surpasses Gar Wood's mark by more than eight miles an hour. The record set by Wood was 111.712 miles an hour, made at Miami, Fla., on Feb. 5, and later accepted by the International Motor Yachting Union and the American Power Boat Association.

Man Gains Speed During Two Years

In two years the speed with which man has driven a motor boat has been increased 21 m.p.h.

On June 13, 1930, the late Sir Henry O. D. Segrave of England, piloting Miss England II, set a record of 98.76 m.p.h. on Lake Windermere in England. On March 20 of the following year Gar Wood took the title back for the United States by driving Miss America IX 102.256 m.p.h. at Miami.

The record lasted less than two weeks, for on April 2, 1931, Kaye Don, in the same boat Sir Henry had piloted, Miss England II, set a new mark of 103.49 over a measured course in the River Parana near its confluence with the River Plate in Buenos Aires.

Again on July 9, 1931, Don, in Miss England II, broke the record with a new mark of 110.223 over a course on Lake Garda in Italy.



World's Automotive Speed Records

Seaplane—408.8 m.p.h., Lieutenant G. H. Stainforth.
Airplane—281.75 m.p.h., L. R. Bayles.
Automobile—253.968 m.p.h., Sir Malcolm Campbell.
Motor Boat—119.81 m.p.h., Kaye Don.

On Feb. 5 of this year Gar Wood once more reclaimed the motor-boat supremacy for the United States by obtaining a speed of 117.12 out of Miss America IX over the Indian Creek water course at Miami, and now Don has bettered that mark by more than eight miles an hour.

Wood to Delay Speed Attempt

DETROIT, July 18—Gar Wood will make no attempt to regain his record for power boats until after the Harmsworth trophy event on Lake St. Clair in September.

Soon after Wood had given his newest boat, Miss America X, its first public trial yesterday, he learned that Kaye Don, driving his Miss England III, had beaten his straightaway record by more than eight miles per hour.

"Say, that's great," Wood said. "I must cable him my congratulations."

Steel Mills Now Show Confidence

"Worst is Over" is Feeling as Seasonal Slump Further Cuts Specifications

NEW YORK, July 21—Sentiment in the steel market is more cheerful, chiefly on the assumption that the dullest period of the year has been passed.

Tapering off in specifications from automotive consumers is accepted as a perfectly natural pause following a period of excellent support of the finished steel market at a time when other consumers were virtually entirely out of it.

For all its shortcomings, sheet mill activity appears to make a comparatively fair showing.

The latest report of the "independents" indicates that in June sales were just about one-half of what they were during the corresponding month of the previous year, output being held down to a like ratio. Shipments ran ahead of fresh sales. Unsold stock was slightly lower at the beginning of this month than a year ago.

Compared with a year ago, the chief decline was in unfilled tonnage which shrunk approximately 73 per cent, indicating the reluctance of buyers to cover more than their urgent requirements in advance and also the absence of reserve stocks in consumers' hands.

The sheet market is characterized as fairly steady, it being admitted that concessions of one sort or another to large consumers, especially in the Detroit area, are not rare.

Strip steel demand is light. Cold finished and alloy steel bars are steady, but most of the buying continues in small lots. Spring wire is moving slowly, but prices are well maintained. All in all, the feeling that all the bad news is out is more in evidence this week than it has been in a long while.

Pig Iron—Blast furnace sales representatives hold the competition of foreign iron, light as the total tonnage brought in may appear, more responsible for the market conditions which have prevailed of late than paucity of demand. Even in those markets in which there is no direct competition with the imported metal the influence of seaboard conditions has had an untoward effect. Somewhat of a change, however, has been noted in the last few days and Middle West sellers are holding rather firm to the \$15.50 base price which prevails at Chicago and Cleveland for local delivery.

Aluminum—Dull and unchanged.

Copper—Utah Copper Company has reopened its Bingham mine and Garfield smelter, giving employment to 1500 men. Rumors have been current that a large consumer bought 8500 tons and paid 5½ cents a pound at which price level the market remains quotable.

Tin—Easier with Straits tin quoted at 20½ cents at the opening of the week.

Lead—The market dipped another \$1 a ton on Monday. Storage battery manufacturers are slow in covering their nearby requirements.

Zinc—Quiet and unchanged.

Sloan Tells Editors Distribution Has Failed, Bringing Poor Times

General Motors Head Holds Press of Nation Can Lead World Back to Readjustment

(Continued from page 117)

for getting these products into the hands of those who need or want them temporarily have broken down."

Discussing the need for the revival of confidence, he said:

"There are millions of people today who could buy, who want to buy, yet who are held back by an unreasoning fear of the future, or the thought that it is unpatriotic for them to buy when others cannot.

"Let them once understand that interdependence is the keynote to modern life; that buying means employment; and one key log will be removed from the jam.

"The industrialist can well afford to give careful study to problems of job insurance. The employee who has faith in the security of his job is ready to buy."

Several maladjustments in the economic life of the country were pointed out by Mr. Sloan.

"While private industry, business and agriculture have taken a severe loss in their earning power, the cost of government in this country is still being maintained largely at the levels of pre-depression values.

"Since taxation has become a considerable factor in the cost of production and the buying-power of every individual, drastic steps must be taken to cut down the rates, else there will be nothing left for the taxpayer.

"Without reward, he cannot be expected to incur the risks of employment and production, nor can he buy as much.

"It is not enough to say that we have fixed obligations which must be met. Every activity must be combed for reduction or elimination, and no stone must be left unturned in bringing about a less costly as well as a more efficient form of government.

"Again we have the problem of the form of taxation as an element in cost. The motor vehicle furnishes an apt case in point. Today motor vehicle owners are paying more than \$1,260,000,000 in special taxes alone annually.

"Where originally the funds so voted were for the purpose of building roads, they now are being diverted in numerous directions. The economic effects are immediate, widespread and serious.

"Similarly, in any other fields where arbitrary price levels have been maintained during the depression, such for example as railroad rates, there is definite need for a revision downward as one of the first steps to recovery.

"I say this because it is axiomatic that no large sectors of our population can be unduly punished without all feeling the reaction in decreased buying power."

Navy Building New Giant Flying Boat; 20-Ton Bomber to Have 100-Ft. Spread

BUFFALO, July 21—The largest flying boat in America is being constructed for the navy in the plant of the Hall-Aluminum Aircraft Corp. Officials here declared it to be second in size only to the DO-X.

While the date of completion is uncertain, construction has progressed to the stage that the boat will be completely assembled and ready for tests at the naval proving station at Hampton Roads early in September.

Parts will be shipped to the proving ground and assembled there by mechanics from the Buffalo plant. The tests are expected to last six weeks.

The giant cruiser is an experimental ship built to navy specifications for long distance patrol flying and heavy bombing. No production contracts have been let, but if the ship is accepted by the Naval Aircraft Inspection Board for fleet use it is expected that the Hall plant will ex-

pand production facilities to fill the order.

One of the novel features of the big craft is its metal construction. Aluminum and other light and strong metals have been fabricated into the hull, engine mountings and wing and rudder construction. Fabric will be used for wing and rudder coverings.

The wing spread is about 100 ft. and the length about 70 ft.

Fuel and oil tanks of unusual size are to be mounted in the hull and wing chambers.

Four powerful Curtiss engines will drive the craft, engines and radiators between mounted on the wing. The motors are built for cooling by a patent anti-freeze solution.

When fully loaded and ready for flight, the craft will weigh 20 tons, including the plane and engines, fuel load, military materials and personnel of the crew.

Gar Wood Fits 6400 hp. in Craft

New Defender, "Miss America X," Powered with Four Packard Engines

DETROIT, July 20—Gar Wood announced that his new defender, Miss America X, will be a 6400 hp. craft, containing four Packard engines instead of two, and having more than twice the power of Miss America IX, with which he set the world record of 111.712 miles an hour at Miami, Fla., last winter. Mr. Wood said he would race only one boat against Kaye Don this year.

He made the announcement in connection with a statement that the christening of the new boat was held Sunday at Algonac, Mich.

Sixty-four hundred horsepower in a speedboat was unheard of until Wood's announcement today. Four-thousand horsepower was claimed for the two-motored Miss England II, driven by Kaye Don here last year. Miss America IX had only 2800 hp. in her two supercharged Packard motors a year ago.

Mr. Wood said the 6400 hp. had been obtained by the installation of new super-chargers and the thorough rebuilding of the four engines, two of which were taken from the hull of Miss America VIII, the boat that George Wood piloted solo in the third heat of last year's event when Miss England II and Miss America IX were disqualified for beating the gun in the second heat.

The dimensions of the new defender, previously announced as 38 ft. long and 10 ft., 6 in. wide, make her 10 ft. longer and 4 in. wider than Miss America IX.

The engines are arranged in tandem with gear boxes between them, each pair supplying power to a port and starboard propeller. Each set-up, Mr. Wood said, constitutes a complete power plant and he said the revolutions per minute of each propeller figured 7500.

Ohio Boosts Workers' Compensation Rates

COLUMBUS, OHIO, July 20—The Ohio Industrial Commission, administrator of the Workmen's Compensation law, announced a number of radical increases in the rates charged for the insurance, effective July 1. The reason assigned for the rate increases are reduced payrolls incidental to the depression, tendency of injured employees to prolong their lost time period, increased medical and hospital fees and liberalization of the rules.

The rate on automobile manufacturers was increased from 60 cents to 80 cents per \$100 payroll.

Body manufacturers received an increase from 90 cents to \$1.10.

Auto garage, including sales rooms, demonstrations and service station, received an increase from 80 cents to \$1.

Radiator manufacturers received an increase from \$1.30 to \$1.50, while rim manufacturers remained the same at \$1.40.

Truck and tractor, coach and wagon manufacturers received an increase from \$1.20 to \$1.50.

Tire and tube manufacturers received an advance from 65 to 80 cents per \$100 payroll.

Michigan June Sales Show Increases

DETROIT, July 20—Passenger car registrations in the state of Michigan during June totaled 11,358, an increase of 705 over the same month last year and an increase of 2483 over May this year.

Ford registrations represented 55 per cent of the total for the state during June, showing an increase of 46 per cent over May and an increase of 42 per cent over June last year. Considerably more than half of the Ford total of 6344 were eights.

The following makes registered increases over June last year: DeSoto, Ford, Plymouth and Reo, and the following showed increases over May this year: Auburn, DeSoto, DeVaux, Ford, Hudson, Marmon, Nash, Packard and Willys-Overland.

Commercial car registrations decreased by 23 units in June compared with May and 37 per cent from the total for June last year. Ford headed the list with 434, Chevrolet was second with 178, Dodge third with 35 and International fourth with 32.

Egloff Author of "Synthesis" Article

In reprinting the paper "Synthesis Improves Oil Products" in our issue of July 16, we inadvertently omitted the name of the author. The author of the paper was Dr. Gustav Egloff of the Universal Oil Products Co., Chicago, and the paper, as stated, was read before the Petroleum Division of the American Institute of Mining and Metallurgical Engineers.

Graham Adds Coupes

DETROIT, July 21—Two coupe models are now in production to round out the line of 1933 Graham sixes introduced in mid-June. Both models—the two-passenger coupe and the four-passenger rumble seat coupe—follow closely the streamline design of the Graham eight, as do the previously announced sixes, the sedan and the convertible coupe.

The two-passenger coupe takes its place as the lowest priced model of the new series, with a factory list price of \$875; the rumble-seat model lists at \$925, the same as the sedan.

Toledo Plants Employment Up

Gains Reported in Automotive and Parts Plants in Ohio City

TOLEDO, July 21—Several Toledo automotive plants are showing employment gains.

The Chevrolet Motors Ohio Co., has recalled 150 men, Electric Auto-Lite added 90 workers last week bringing its total to 1192, and the Dura Co. added 50 workers.

Fifty-one plants covered in a weekly survey have shown 1281 workers placed on payrolls since July 1.

The City Auto Stamping Co. is putting 75 men back to work after being shut down for a few weeks.

The Logan Gear Co. reports a contract with Chrysler Motors Co., which will mean a considerable increase in its production schedule about Sept. 1.

The Lucas Manufacturing Co., operating Goerlich's, Inc., and the Associated Parts, Inc., has purchased a fourth small plant to expand its business resulting from heater contracts signed for fall delivery. The company output so far this year has exceeded 1931 and will run to a volume of about \$4,000,000 for 1932.

Nash Dividend Cut to 25c Share

CHICAGO, July 20—Directors of Nash Motors Co. have authorized distribution of a dividend of 25 cents a share to stockholders. At the same time the company reported net earnings of \$322,280, after all charges for the second quarter of its fiscal year, which ended May 31. The earnings are equivalent to 12 cents a share on the 2,730,000 shares of capital stock outstanding. In the corresponding period last year the company earned \$1,265,573, or 47 cents a share.

Michigan Automotive Employment Increases

DETROIT, July 21—Employment in the automobile industry in the state of Michigan during June, according to a statement by the Dept. of Labor and Industry based on reports of 62 companies, totaled 137,834, compared with 136,802 in May and 173,409 in June, 1931.

The aggregate weekly pay roll for June this year totaled \$3,254,148, against \$3,619,587 in May and \$4,915,566 in June last year.

Address Wanted

We should like to receive the street address of Robert Miller of New York, whose suction brake system was described in our issue of June 11, as we have an inquiry for it.—Editor.

Amtorg Reports 86% Trade Drop

Soviet Agency Says Decrease From First Half of 1931 Due to Lack of Credit

NEW YORK, July 21—The Amtorg Trading Corp., agents for the Soviet Union in the United States, announced yesterday that its purchases here during the first half of 1932 amounted to only \$5,549,000, compared with \$40,593,000 for the first six months of last year, a decline of 86 per cent and with \$42,099,000 for the first half of 1930, a decline of 87 per cent.

The decline, it was explained, was due principally to lack of credit facilities comparable to those existing in Europe, where extensive long-term credits, partly government-guaranteed, were available, and in particular to the restrictions imposed on the importation of Soviet products into this country.

While on a limited amount of orders there had been noted some improvement in the credit situation it was said this had not been sufficient to warrant a substantial volume of business.

In contrast with this situation, Soviet-German economic relations have just entered a new phase with the recently concluded trade and tariff agreements between the two countries, while additional long-term credits in England have led to increased Soviet purchasing in the last few months.

Details of the new German-Soviet trade agreement just received in this country indicate that the credit terms extended by German manufacturers on Soviet orders vary only slightly from those provided in the 1931 accord, which led to an unprecedented development of trade between the countries, Soviet purchases in Germany last year amounting to about \$230,000,000.

The agreement, which was concluded on June 15 after extended negotiations between the Federation of German Industries and the Soviet Trade Delegation in Germany, provides for final payments running up to 29 months after date of delivery on orders placed for the Soviet Union.

The average credits range from 15 to 24.7 months, depending on the type of product, and in cases of specially large transactions longer credits may be arranged.

Worthington Merges Cincinnati and Buffalo Plants

Worthington Pump and Machinery Corp., New York and Harrison, N. J., will consolidate the designing, engineering and manufacturing activities formerly carried on at their Cincinnati works with those of their Buffalo, N. Y., plant.

The Cincinnati plant equipment and sales office will remain intact.

Hanch Hits Both Major Party Platforms, Urges Federal Reserve Law by Congress

Rediscounting of Finance Company Paper, Head of Association Says, Would Give Consumer Much-Needed Aid at This Time

CHICAGO, July 20—Failure of the political program of either major political party, as expressed through its platform, to consider the needs of the man who wants to buy goods and incidentally help to start the factories of the nation, was pointed out recently by C. C. Hanch, general manager of the National Association of Finance Companies, in a plea for the immediate enactment of a law making finance company paper eligible for rediscount at Federal Reserve Banks.

"Both platforms express approval of economy, a sound currency, a tariff and unemployment relief. Both favor justice for veterans, assistance for farmers and revision of banking laws. Both parties want to extend 'credit' but neither has anything to say about extending it to the man who needs it most, the consumer," said Mr. Hanch.

"A factory does not need money to manufacture merchandise if no one will buy it and Americans won't buy and can't buy if they have neither

cash nor credit. Recent efforts on the part of the federal government to aid the cash position of banks have not created credit for the consumer, but there is a remedy which is available to Congress at the present time.

"Finance companies are now penalized in their efforts to extend consumer credit because their paper is not eligible to rediscount. This deficiency can be remedied by the passage of the Sheppard Bill, S.4550, or its companion, the Ayres Bill, H.R.12313, both of which would make the notes of finance companies eligible for rediscount with the Federal Reserve Banks.

"The passage of either of these bills would ease the banking tension, release large amounts of currency now held in bank vaults as emergency reserves, decrease the cost of buying goods on instalments, and increase the consumption of durable goods, thus increasing the rate of factory operations and putting millions of men back to work," he declared in his statement.

June Crude Consumption Shows 34% Increase

Consumption of crude rubber by manufacturers in the United States for the month of June amounted to 39,116 long tons as compared with 29,197 long tons for May, 1932, and represents an increase of 34 per cent. This is the highest consumption for any one month since May, 1930, according to statistics released by The Rubber Manufacturers Association today.

This organization reports imports of crude rubber for the month of June to be 41,394 long tons, an increase of 28.5 per cent over May, 1932, but 9.6 per cent below June a year ago.

This Association estimates total domestic stocks of crude rubber on hand June 30, at 345,702 long tons, which compares with May 31 stocks of 346,231. June stocks show practically no change as compared with May of this year, but were 53.3 per cent above the stocks of June 30, 1931.

The participants in the statistical compilation report 43,079 long tons of crude rubber afloat for the United States ports on June 30. This compares with 50,453 long tons afloat on May 31, 1932, and 52,066 long tons afloat on June 30, 1931.

Norton Absorbs Pike Adding New Activity

WORCESTER, MASS., July 21—Norton Co. has added a new unit to its

activities by acquiring the entire common stock of the Pike Mfg. Co. of Pike, N. H. The new unit will be incorporated under the name of Norton Pike Co.

Pike Mfg. Co. was founded in 1823, taking advantage of a natural abrasive rock suitable for sharpening scythes. About 30 years ago the well-known brand of India oilstones manufactured of electric furnace Alundum abrasive by Norton Co.

For the present the Pike business will be continued as in the past but on or about Sept. 1 a new marketing plan will be adopted, the details of which will be properly announced to the trade.

South Carolina Fees Fall Off

COLUMBIA, S. C., July 21—The semi-annual report of B. M. Sawyer, chief highway commissioner, shows a noticeable decrease in funds from the sale of automobile licenses, registrations falling off in every county in the state.

For the first six months of 1932, total receipts from the sale of licenses amounted to \$2,183,546.24, as compared with \$2,427,717.75 for the corresponding period of last year.

Total registration of automobiles for the first six months of this year were 139,917, as compared with 161,555 for the corresponding period of 1931. Registration of trucks for a similar period were: 1932, 19,302; 1931, 22,417.

Rubber Industry Seeks Stabilization Through Banker-Industrialist Group

Committee Appointed to Draft Recommendations Soon; Free Tubes, Free Service Hit By Chairman Bishop, Large Rubber Stockholder, in Statement

AKRON, OHIO, July 20—Formation of an advisory committee of prominent New York and Cleveland bankers and industrial leaders to assist tire manufacturers in efforts to stabilize the rubber industry was announced here this week.

George T. Bishop, Cleveland, president, Continental Shares, Inc., largest single holder of tire stocks, and a Goodyear Tire & Rubber Co. director, is chairman of the advisory committee.

Other members of the committee are: Irene du Pont, vice chairman of the board of E. I. du Pont de Nemours & Co., which controls United States Rubber Co.; Charles S. McCain, chairman of the board of the Chase National Bank of New York, and a B. F. Goodrich director; Harris Creech, Cleveland, president Cleveland Trust Co. and a director of Continental Shares, and Robert L. Clarkson, of the Chase Securities Co. of New York, a Goodyear director.

First recommendations of the new committee to leaders of the rubber industry will be drafted within two weeks, it was reported here. The recommendations will not be made public.

The committee will act in a purely advisory capacity without power to

compel individual companies to adopt its recommendations, Bishop announced.

In a formal statement to the press here, Bishop indicated first recommendations of the committee will be intended to eliminate cut-throat competition between large and small rubber companies and the larger mail order houses.

"The first thing we will take up will be these free tube offers, free service and the like with casing purchases," Bishop said. "They are unethical and ought to be done away with. Later we will get around to other things which need correction in the rubber industry."

On the mail order question, Bishop said, "We have been to see the mail order people already and have talked the situation over with them. I believe they will cooperate in whatever we do."

"We expect to call on the heads of smaller units of the rubber business right away. Some of these smaller factories are important factors in the business and we will see them before anything is done."

Next meeting date of the committee in New York is indefinite, Bishop said, but indicated it will be within a few weeks.

Auburn Net Loss 72c. for Quarter

\$151,987 Loss Compares with \$2,158,765 Profit for Like Period, 1931

CHICAGO, June 20—Auburn Automobile Co. and its subsidiaries for the months of March, April and May, the second quarter of 1932, showed a net loss of \$151,987.20, equal to 72 cents per share on 210,652 shares outstanding on that date.

This compares with net profits of \$2,158,765, equal to \$10.24 a share, for the like period of 1931, and compares with net profits of \$769,385, equal to \$3.65 a share, for the like period in 1929, based on the present capitalization.

For the first six months ended May 31, 1932, the consolidated net loss was \$144,028, equal to 68 cents per share, as compared to net profits of \$2,361,175, equal to \$11.21 per share in 1931, and compares to net profits of \$866,009, equal to \$4.11 a share in the first six months of 1930, based on the present capitalization.

The consolidated balance sheet of the company and its subsidiaries as of May 31, 1932, show current assets of \$12,517,912, of which \$4,248,825 are in cash and government securities.

Comparative Profit and Loss Statement of Auburn Automobile Co. and Subsidiaries for the Period March 1, 1932, to May 31, 1932, Comprising Second Quarter

	1931	1932
Sales—Net	\$19,847,984	\$3,213,457
Cost of Sales, excluding Depreciation	15,621,914	2,495,926
Gross Profit	\$ 4,226,070	\$ 717,531
Administrative and Selling expense	1,418,906	787,023
Operating Profit before Depreciation	\$ 2,807,164	\$ 69,492 L
Other Income ...	119,691	57,191
	\$ 2,926,855	\$ 12,301 L
Depreciation	136,027	151,288
	\$ 2,790,828	\$ 163,589 L
Other Expense ..	32,802	36,666
Net Profit before Federal Income Tax	\$ 2,758,026	\$ 200,255 L
Provision for Federal Income Tax	247,089	.....
	\$ 2,510,937	\$ 200,255 L
Proportion of Net Profit or Loss of Subsidiary Companies Applicable to Minority Common Stockholders	352,172	48,268
Consolidated Net Profit or Loss..	\$ 2,158,765	\$ 151,987 L
May 31, 1932 — 210,652 Shares Outstanding — Per Share	\$ 10.24	\$.72 L
First Six Months Consolidated Net Profit	\$ 2,361,175	\$ 144,028 L
210,652 Shares Outstanding May 31, 1932— Per Share	\$ 11.21	\$.68 L
L—Loss.		

Dodge Takes Third Place

DETROIT, July 20—Figures just compiled by Dodge Brothers Corp., covering the first five months this year, show that in the number of passenger cars and trucks sold at retail in the United States, Dodge dealers occupied third place in the industry, according to a statement by A. vanDerZee, general sales manager.

The figures further show that deliveries of passenger cars and trucks by Dodge dealers during June, 1932, exceeded deliveries during the same month last year by 20.9 per cent. Overall deliveries during the 10-week period from April 24 to July 2 were also above last year's figures by 8.2 per cent.

Ernst Sachs

Word has been received from Germany of the sudden death there of Privy Councilor Ernst Sachs of Schweinfurth-on-Main, one of the principals of the Fichtel & Sachs ball-bearing concern, whose F. & S. ball-bearing was widely used in this country before the war. He was the originator of the Torpedo coaster brake

and the F. & S. ball bearing and had a prominent part in pioneering the bicycle, motorcycle and automobile industries in Germany.

Millions of the F. & S. bearings were imported into this country between 1900 and 1912, during which latter year a factory for their production was established at Lancaster, Pa., now the property of the Bearings Co. of America.

During the past two years Mr. Sachs was chairman of the United Ball Bearing Works, a merger of seven German ball bearing factories. He is survived by one son, Vice-Consul Willy Sachs, who will carry on the work of his father.

Aero Plant Resumes

The Junkers Aircraft Works, which were shut down some time ago on the occasion of a reorganization of the business, have resumed operations, but with a largely reduced personnel. The firm is now known as the Junkers-Flugzeugwerk Betriebs G.m.b.H. (Junkers-Aircraft Works Operating Co., Inc.) and is under the management of Herr Hormel, a member of the board of directors of the Focke-Wulf-Albatross Aircraft Co.

67 Entrants Are In For World Reliability Tour

BERLIN (*Special*), July 20—Entrants in the International Reliability Tour for 1932, to be held in August under the auspices of the German Flying Club, totaled 67 participants representing flying clubs in Germany, France, Italy, Poland, Switzerland and Czechoslovakia, according to a report to the Department of Commerce.

The tour this year will consist of a race over a 5196-mile course, starting at Berlin and continuing through Czechoslovakia, Austria, Italy, France, the Netherlands and back to Berlin, it is said.

The most important obstacles in this year's tour are the crossing of the Alps between Cannes and Lyons, France, and the flying over the water stretch from Copenhagen, Denmark, to Gothenburg, Sweden, it is said.

The entire trip must be completed in six days, with one day for rest, according to the rules.

Each competitor must have a complete liability insurance policy effective in all countries to be flown over, and all of the planes must comply with certain specifications and carry specified equipment, it is reported. Airworthiness certificates issued by the country in which the plane was constructed are also required.

A silver cup and money prizes ranging from 100,000 francs (\$3,920) to 7000 francs (\$274) will be awarded the winners. The participants must pay all of their own expenses, it is said.

Litchfield to Confer With Hugo Eckener

AKRON, July 20—P. W. Litchfield, president of the Goodyear Tire & Rubber Co., sailed from New York last week on the steamer "Georgia" for a month's vacation in Europe.

He will visit Dr. Hugo Eckener, Graf Zeppelin commander, at Friedrichshafen, Germany, for a conference on lighter-than-air developments before returning to Akron.

Illinois Collects 16 Million in Fees

CHICAGO, July 20—The state automobile department collected \$16,059,844 in fees for the first six months of the year, according to the report of Secretary of State William J. Stratton, of Illinois.

The semi-annual reports shows sale of 1,362,550 pairs of automobile license plates in the first half of the year. Of these 1,203,750 were for passenger cars and 158,820 for trucks.

H. D. Dodge Head of Canada Graham-Paige

DETROIT, July 20—Harry D. Dodge has been named managing director of Graham-Paige of Canada in charge of plant operations at Walkerville and all

sales activities in Canada, succeeding Arthur Krueger, who resigned.

He has been associated with Graham Brothers for 14 years, the past six years in export work and as managing director of branch factories in Europe.

June Chevrolet Sales 10 Per Cent Under May

DETROIT, July 20—Chevrolet dealers reported the sale of 43,397 new cars and trucks in June, according to an announcement by W. S. Knudsen, president and general manager.

The figure exceeded by 10,000 units domestic production for the month and was within 10 per cent of the reported sales for May.

He cited figures by ten-day periods to show the effect of the new federal tax on sales for the month. In the first ten days, dealers reported 12,486 units sold; in the second ten days, 18,544 units and in the last ten days, when the new tax was in effect, 12,367 units. Normally the last period of the month is the largest, Mr. Knudsen said.

All sections of the country showed a favorable comparison in the last ten days with the first ten days of the month.

Motor Products Show Profits Instead of Loss

DETROIT, July 20—Motor Products Corp. has reported a net profit of \$55,493 for the second quarter, equivalent to 29 cents a share, against a net loss of \$179,526 in the first quarter this year and a net profit of \$164,434 in the corresponding quarter last year.

Plymouth Reaches Peak With 4676 Deliveries

DETROIT, July 20—Retail deliveries of Plymouth cars by DeSoto, Dodge and Chrysler dealers in the United States reached a new peak for the year with the week ending June 25, during which 4676 new Plymouths were delivered, according to a factory statement. This compares with 3788 for the week ending June 18 and 3316 for the week preceding that. Last year the retail deliveries for the corresponding week were less than one-fourth of those of the record week this year. Similarly, five times as many Plymouths were delivered during the week ending June 25 this year as during the week ending June 20, 1931.

Complete registration figures which have been received from 48 states and the District of Columbia for the month of May show that Plymouth registrations increased 311 per cent over May, 1931, and 22 per cent over April of this year. Actual figures were 13,591 for May, 1932, compared to 3304 during the same month last year.

Judd Public Relations Chief at Goodyear

L. E. Judd, former editor of the Akron *Times-Press*, has been appointed director of public relations of the Goodyear Tire & Rubber Co., effective July 18. He will succeed Hugh Allen, author of booklets on the history of lighter-than-air aviation and construction of the U. S. Akron and Macon, who will now devote his entire time to activities of the Goodyear Zeppelin Corp.

+ + CALENDAR OF COMING EVENTS + +

FOREIGN SHOWS

London, Olympia ShowOct. 13-22
Glasgow, Scottish Motor Show.....Nov. 11-19
Paris, Aeronautical Show.....Nov. 18-Dec. 4

CONVENTIONS

American Chemical Society, Denver, Colo.Aug. 22-26
S.A.E. Aircraft Meeting, ClevelandAug. 30-Sept. 1
American Society Mechanical Engineers, Cleveland, Ohio (Machine shop practice meeting)Sept. 12-17
American Trade Association Executives, Atlantic City (Annual)Sept. 15-17
Penna. Automotive Assn., Harrisburg, Pa.Sept. 19-20
Natl. Assoc. of Motor Bus Operators, ChicagoSept. 22-23
American Electric Railway Assn., Chicago, Ill.Sept. 22-23
Amer. Institute Mining & Met. Engrs. (Petroleum Division), Dallas, TexasSept. 30-Oct. 1
S.A.E. Production Meeting, BuffaloOct. 3
Amer. Society for Steel Treating, BuffaloOctober 3

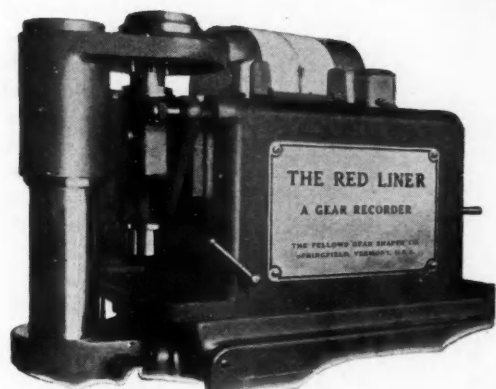
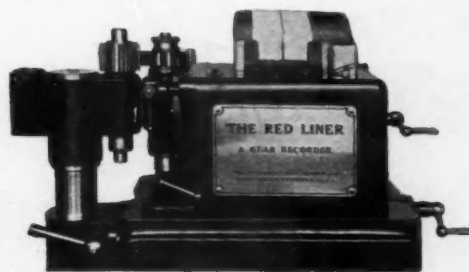
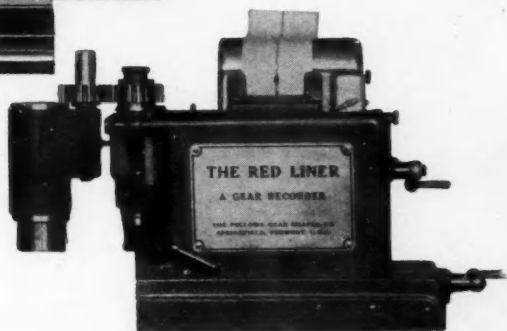
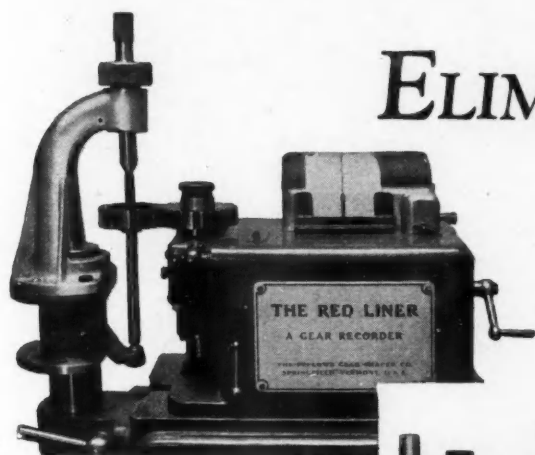
Amer. Institute Mining & Met. Engrs. (Iron & Steel Division), Buffalo, N. Y.Oct. 3-6
National Safety Council, Washington, D. C.Oct. 3-7
American Welding Society, Buffalo, N. Y.Oct. 3-7
American Society Mechanical Engineers, Buffalo, N. Y. (Natl. Iron and Steel Meeting).....Oct. 3-8
S. A. E. Annual Transportation Meeting, TorontoOct. 4-6
American Gas Association, Atlantic City (Annual)Oct. 10-14
Natl. Hardware Assn. (Accessories Branch), Atlantic City, N. J.Oct. 17-22
Natl. Tire Dealers Assoc., Atlanta, Ga.Nov. 14-16
American Society Mechanical Engineers, New York City (Annual Meeting)Dec. 5-9
Natl. Exposition of Power & Mechanical Engineering, New YorkDec. 5-10

RACES

AltoonaSept. 5

ELIMINATE "TEARDOWNS"

Use the
RED LINER



A NEW EDITION

A new edition of an interesting and instructive booklet, describing the advantages and application of THE RED LINER, has just been received from the printer. A copy is awaiting your request.

It is a waste of time and money to tear down a completed gear assembly because of faulty gearing that has passed inspection. Don't blame your inspector if you have not provided him with proper facilities. Ordinary gear inspection devices which do not record errors in combination cannot possibly approach conditions that exist in the assembled unit. The RED LINER is the only machine which accurately and unfailingly reveals all errors in combination, and in a permanent form which eliminates all possibility of dispute. Ask to have one of our representatives call and if necessary, demonstrate the possibilities of this modern gear inspection machine. Write:

The Fellows Gear Shaper Company
78 River Street, Springfield, Vermont
(616 Fisher Building, Detroit, Mich.)

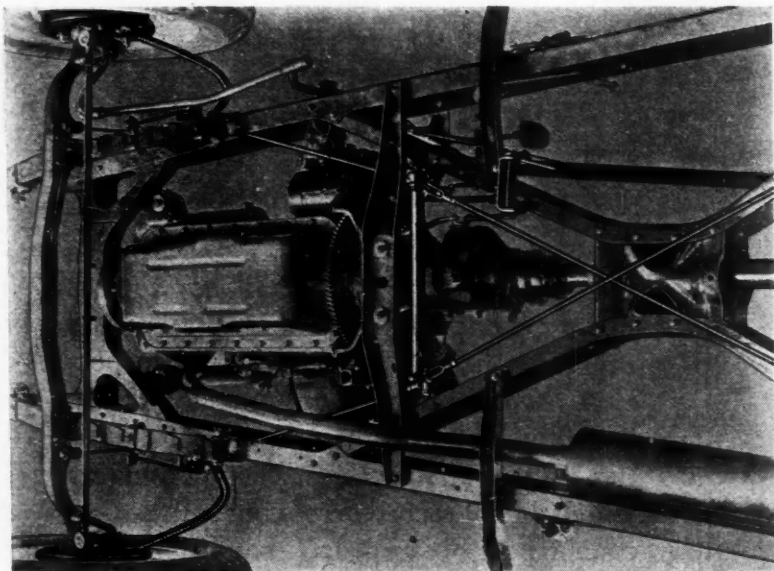
FELLOWS

~ GEAR SHAPERS ~

and "RED LINER" Inspection

Hudson Zooms Into Low-Price Market

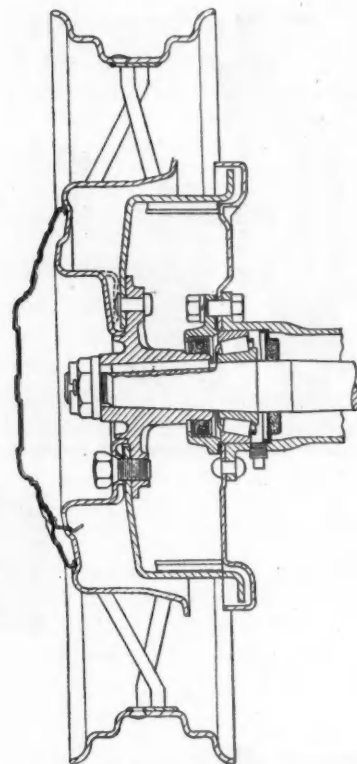
(Continued from page 99)



On the inside of this drum there are internal gear teeth which are engaged by the sliding collar on the splined main shaft for direct drive. The internal teeth for engaging the second speed are cut in the flange of the cupped unit which forms the second-speed gear. Bronze lock rings take the thrust of the main-shaft gear units.

There is another steel-tube, babbitt-lined bearing at the rear of the countershaft, while a similar bearing at the front of the countershaft is extended beyond the case, to increase the bearing area. The whole design is beautifully compact, with an exceptionally short center distance between bearings. Gear ratios are 1.61 to 1 in second, and 2.42 to 1 in low, and 3.30 to 1 in reverse. The reverse idler is also mounted on a babbitt-lined bearing.

The frame has a K-shaped box member at the front end, and the central X-member is exceptionally long, its forward legs extending to a point on the frame almost opposite the center of the engine. The body pan, which is bolted to this cross-member, is further provided with reinforcing channels at suitable points



Safe, non-skid braking, with equalized action, is provided in the new Essex Terraplane diagonal brake application—the type used on several of the costliest cars in Europe, where it was developed especially to meet the severe requirements of Alpine motoring. The line of cable application parallels the rigid girder members of the deep, rugged frame

and also has ribs stamped in to obviate any tendency to drumming. There are only two cut-outs in the entire pan, one for rear-axle center-section clearance, the other for the battery box, which is also located under the rear seat.

Essex Terraplane Specifications

Engine	6-cyl. 2 15/16 x 4 3/4 in.
Displacement	193 cu. in.
Taxable hp.	20.7
Brake hp.	70 at 3200 r.p.m.
Camshaft drive	non-metallic gear
Cooling	pump
Engine lubrication	pressure
Wheelbase	106 in.
Clutch	disk in oil
Gearset	3-speed
Universal joints	Spicer
Rear axle	semi-floating
Torque taken by	springs
Brakes	Bendix
Brake diameter	9 in.
Springs	semi-elliptic
Tires	5.25/17